

AD-A273 110



2

U.S. ARMY
MATERIEL COMMAND

— COMMITTED TO PROTECTION OF THE ENVIRONMENT —

FINAL
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS AND SOUTH PLANT
VERSION 3.2

DTIC
ELECTE
NOV 24 1993
S A

This document has been approved
for public release and sale; its
distribution is unlimited.

EBASCO SERVICES INCORPORATED

R. L. Stollar and Associates
California Analytical Laboratories, Inc.
DataChem, Inc. Geraghty & Miller, Inc.

REQUESTS FOR COPIES OF THIS DOCUMENT
SHOULD BE REFERRED TO THE PROGRAM MANAGER
FOR THE ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP,
AMXRM ABERDEEN PROVING GROUND, MARYLAND

93-28775



93 11 22 0 8 6

88286R08

(2)

LITIGATION TECHNICAL SUPPORT AND SERVICES

ROCKY MOUNTAIN ARSENAL

FINAL
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS AND SOUTH PLANTS
VERSION 3.2

September 1988
Contract No. DAAK11-84-D-0017
TASK NO. 10

DTIC
ELECTE
NOV 24 1993
S A

Prepared by:

EBASCO SERVICES INCORPORATED
R.L. STOLLAR AND ASSOCIATES
CALIFORNIA ANALYTICAL LABORATORIES, INC.
DATACHEM, INC. GERAGHTY & MILLER, INC.

Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

THE INFORMATION AND CONCLUSIONS PRESENTED IN THIS REPORT REPRESENT THE OFFICIAL POSITION OF THE DEPARTMENT OF THE ARMY UNLESS EXPRESSLY MODIFIED BY A SUBSEQUENT DOCUMENT. THIS REPORT CONSTITUTES THE RELEVANT PORTION OF THE ADMINISTRATIVE RECORD FOR THIS CERCLA OPERABLE UNIT.

THE USE OF TRADE NAMES IN THIS REPORT DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR APPROVAL OF THE USE OF SUCH COMMERCIAL PRODUCTS. THE REPORT MAY NOT BE CITED FOR PURPOSES OF ADVERTISEMENT.

This document has been approved
for public release and sale; its
distribution is unlimited.

REPORT DOCUMENTATION PAGE			Form Approved OMB No. 2704-0188	
<small>Public reporting burden for this collection of information is estimated to average 1 hour per response, including reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Project Director (0704-0188), Washington, DC 20503.</small>				
1. AGENCY USE ONLY (Leave blank)		2. REPORT DATE 09/00/88		3. REPORT TYPE AND DATES COVERED
4. CONTAMINATION ASSESSMENT REPORT, CHEMICAL SEWERS, NORTH PLANTS AND SOUTH PLANTS, TASK 10, FINAL, VERSION 3.2			5. FUNDING NUMBERS DAAK11 84 D 0017	
6. AUTHOR(S)				
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) EBASCO SERVICES, INC.			8. PERFORMING ORGANIZATION REPORT NUMBER 88286R08	
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) ROCKY MOUNTAIN ARSENAL (CO.). PMRMA			10. SPONSORING / MONITORING AGENCY REPORT NUMBER	
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT APPROVED FOR PUBLIC RELEASE; DISTRIBUTION IS UNLIMITED			12b. DISTRIBUTION CODE	
13. ABSTRACT (Maximum 200 words) <p>THIS FINAL REPORT DOCUMENTS THE PHASE I CONTAMINATION SURVEY OF THE CHEMICAL SEWERS IN NORTH PLANTS AND SOUTH PLANTS.</p> <p>NORTH PLANTS: 8 SAMPLES FROM 8 BORINGS WERE ANALYZED. DIMP, CD, ZN, AND HG WERE DETECTED WITHIN OR ABOVE THEIR RESPECTIVE INDICATOR RANGES; HOWEVER, THE CONCENTRATIONS OF CD AND ZN APPEARED TO BE CONSISTENT WITH NATURALLY OCCURRING LEVELS. A</p> <p>PHASE II PROGRAM MAY BE NEEDED. IF THIS WORK IS DONE, IT WILL CONSIST OF 4 ADDITIONAL BORINGS. THE VOLUME OF POTENTIALLY CONTAMINATED SOIL PRESENT IS ESTIMATED AT 140,000 CUBIC YARDS.</p> <p>SOUTH PLANTS: 68 BORINGS, YIELDING 103 SAMPLES, WERE COMPLETED IN 11 TRENCHES AND 5 MANHOLES. 37 TARGET ANALYTES AND A LARGE NUMBER OF TENTATIVELY IDENTIFIED NONTARGET COMPOUNDS WERE DETECTED INCLUDING PESTICIDES, HERBICIDES, PROCESS INTERMEDIATES, SOLVENTS, AND METALS. ALDRN AND DBCP WERE DETECTED AT GREATER THAN 10,000</p>				
14. SUBJECT TERMS SOIL, CHEMICAL			15. NUMBER OF PAGES	
			16. PRICE CODE	
17. SECURITY CLASSIFICATION OF REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT	

TABLE OF CONTENTS

Part I Chemical Sewers - North Plants

Part II Chemical Sewers - South Plants

Part III Appendices, Chemical Sewers

Appendix CS-A Chemical Names and Abbreviations

Appendix CS-B Chemical Data

Appendix CS-C Calculations for the Structural Stability
of the Pipe in Trenches CS01, CS02, and CS03

Appendix CS-D Comments and Responses

DTIC QUALITY INSPECTED 8

Accession For	
NTIS CRA&I	<input checked="" type="checkbox"/>
DTIC TAB	<input type="checkbox"/>
Unannounced	<input type="checkbox"/>
Justification	
By	
Distribution /	
Availability Codes	
Dist	Avail and/or Special
A-1	

LITIGATION TECHNICAL SUPPORT AND SERVICES

ROCKY MOUNTAIN ARSENAL

FINAL
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS
VERSION 3.2

September 1988
Contract No. DAAK11-84-D-0017
TASK NO. 10

Prepared by:

EBASCO SERVICES INCORPORATED
R.L. STOLLAR AND ASSOCIATES
CALIFORNIA ANALYTICAL LABORATORIES, INC.
DATACHEM, INC. GERAGHTY & MILLER, INC.

Prepared for:

U.S. ARMY PROGRAM MANAGER'S OFFICE FOR
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP

THE INFORMATION AND CONCLUSIONS PRESENTED IN THIS REPORT REPRESENT THE OFFICIAL POSITION OF THE DEPARTMENT OF THE ARMY UNLESS EXPRESSLY MODIFIED BY A SUBSEQUENT DOCUMENT. THIS REPORT CONSTITUTES THE RELEVANT PORTION OF THE ADMINISTRATIVE RECORD FOR THIS CERCLA OPERABLE UNIT.

THE USE OF TRADE NAMES IN THIS REPORT DOES NOT CONSTITUTE AN OFFICIAL ENDORSEMENT OR APPROVAL OF THE USE OF SUCH COMMERCIAL PRODUCTS. THE REPORT MAY NOT BE CITED FOR PURPOSES OF ADVERTISEMENT.

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>EXECUTIVE SUMMARY</u>	
1.0 <u>PHYSICAL SETTING</u>	1
1.1 <u>LOCATION AND DESCRIPTION</u>	1
1.2 <u>GEOLOGY</u>	6
1.3 <u>HYDROLOGY</u>	6
2.0 <u>HISTORY</u>	9
3.0 <u>FIELD INVESTIGATION</u>	11
3.1 <u>PREVIOUS INVESTIGATIONS</u>	11
3.2 <u>FIELD SURVEY</u>	20
3.2.1 <u>Field Program</u>	20
3.2.2 <u>Field Observations</u>	23
3.2.3 <u>Geophysical Exploration</u>	24
3.2.4 <u>Analyte Levels and Distribution</u>	24
3.2.5 <u>Contamination Assessment</u>	34
3.3 <u>FOLLOW-ON INVESTIGATIONS</u>	36
3.4 <u>QUANTITY OF POTENTIALLY CONTAMINATED SOIL</u>	40
4.0 <u>REFERENCES CITED</u>	42

LIST OF FIGURES

Figure	Page
CS-NP-1 Location Map of the North Plants Chemical Sewer System	2
CS-NP-2 Typical Manhole Configuration	3
CS-NP-3 Field Boring Profile for Well 36090	7
CS-NP-4 Sampling Grid Used by MKE	14
CS-NP-5a Grain Size Distribution Curve, Physical Sample, 4.6-5.5 ft., Trench MKE 11, Section 36	28
CS-NP-5b Grain Size Distribution Curve, Physical Sample, 5.2-5.9 ft., Trench MKE 22, Section 36	29
CS-NP-6a Analytes Detected Within or Above Indicator Levels, Trench MKE 11, Section 36	31
CS-NP-6b Analytes Detected Within or Above Indicator Levels, Trench MKE 22, Section 36	32
CS-NP-7a Proposed Additional Borings and Sample Locations, Trench MKE 11, Section 36	38
CS-NP-7b Proposed Additional Borings and Sample Locations, Trench MKE 22, Section 36	39

LIST OF PLATES
(in pocket)

Plate

- CS-NP-1 Vicinity Map Showing Sampling Locations**
- CS-NP-2 Topography and Surface Drainage**
- CS-NP-3 Water Table Elevations and Generalized Groundwater Flow**

LIST OF TABLES

Table	Page
CS-NP-1 North Plants Area Buildings Connected to the Chemical Sewer	4
CS-NP-2 Results of MKE Sewer Investigation: Chemical Sewer - North Plants	15
CS-NP-3 Tentative Identification of Nontarget Compounds - MKE Data. . .	17
CS-NP-4 Manhole Reconnaissance Survey Observations	22
CS-NP-5 Summary of Analytical Results for Chemical Sewer - North Plants	25
CS-NP-6 Results of Field Study.	26
CS-NP-7 Summary of Soil Properties, Indexes and Harvard Miniature Compaction Test	27
CS-NP-8 Tentative Identification of Nontarget Compounds	33

EXECUTIVE SUMMARY
CHEMICAL SEWER - NORTH PLANTS

The North Plants chemical sewer is located within the North Plants manufacturing complex in Section 25 and the northern half of Section 36 on the Rocky Mountain Arsenal. At the present time, the North Plants chemical sewer system is inactive. The sewer system collected process wastewater from various buildings and conveyed it to a sump, Building 1727, where it was neutralized with caustic and then initially pumped to Basin A and later to Basin F through the chemical sewer line. Locations along the chemical sewer were investigated under Task 10 during the fall of 1986. A total of 8 borings were drilled to depths ranging from 5.5 to 6.7 feet, yielding 6 samples for chemical analysis and 2 samples for physical analysis.

The following target analytes were detected within or above their indicator levels in borings directly beneath the sewer line: diisopropylmethyl phosphonate, cadmium, zinc, and mercury. Diisopropylmethyl phosphonate was detected in one boring. Cadmium and zinc were detected together in one sample but at concentrations consistent with the natural levels in the soils being analyzed. Mercury was detected above its indicator range in three borings. Five nontarget compounds were tentatively identified in three borings. These compounds were present at relatively low concentrations in soils directly beneath the sewer line.

Follow-on work may be needed as determined by the Feasibility Study to more precisely define the extent of contamination associated with the North Plants chemical sewer. If this work is done, it will be completed as part of the conceptual or detailed design phase of remedial action for the sewer and will consist of 4 borings yielding a maximum of 18 samples.

Based on historic data and information obtained to date, the estimated volume of potentially contaminated soil along the chemical sewer line in the North Plants area is 140,000 cubic yards.

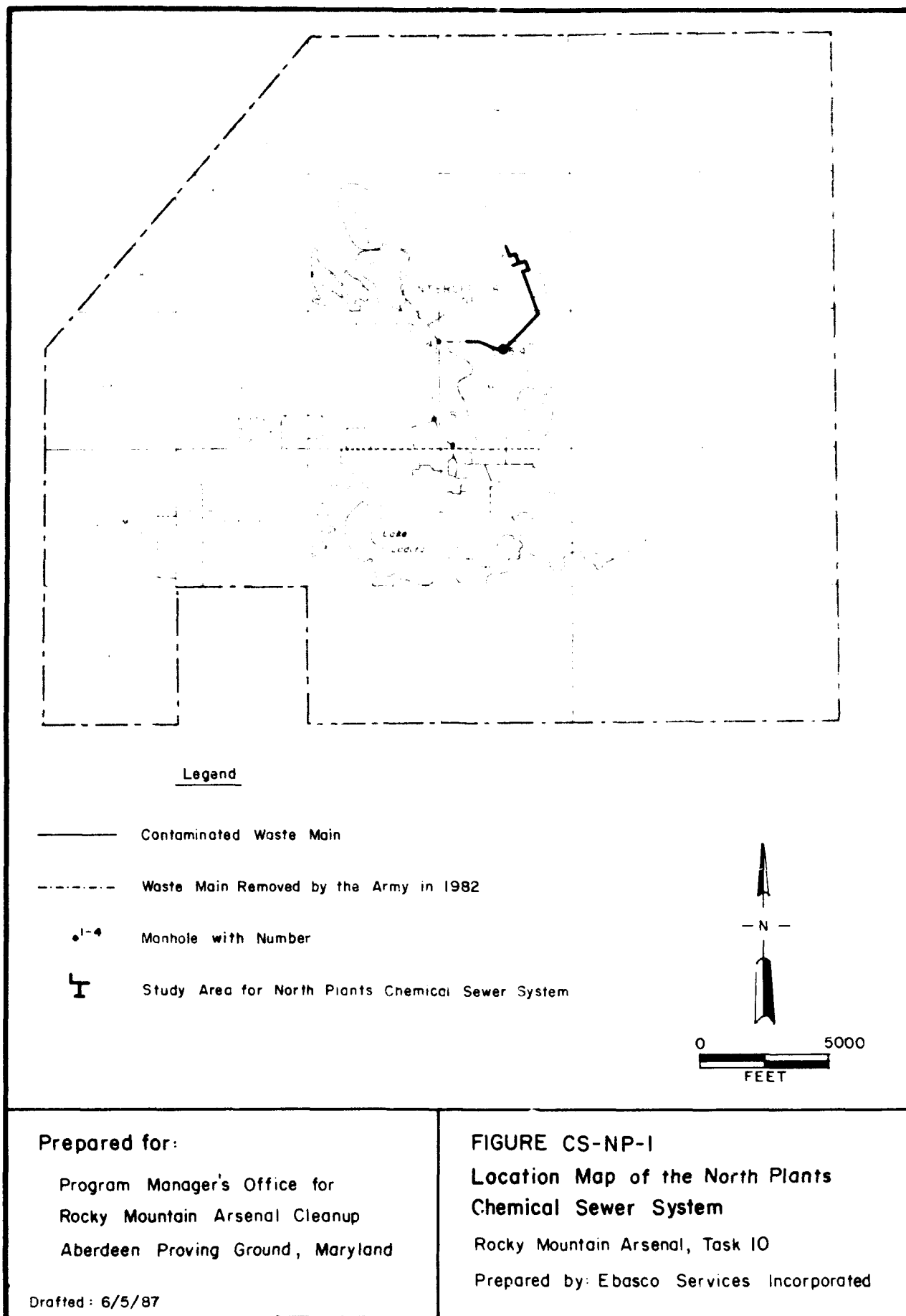
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWER - NORTH PLANTS

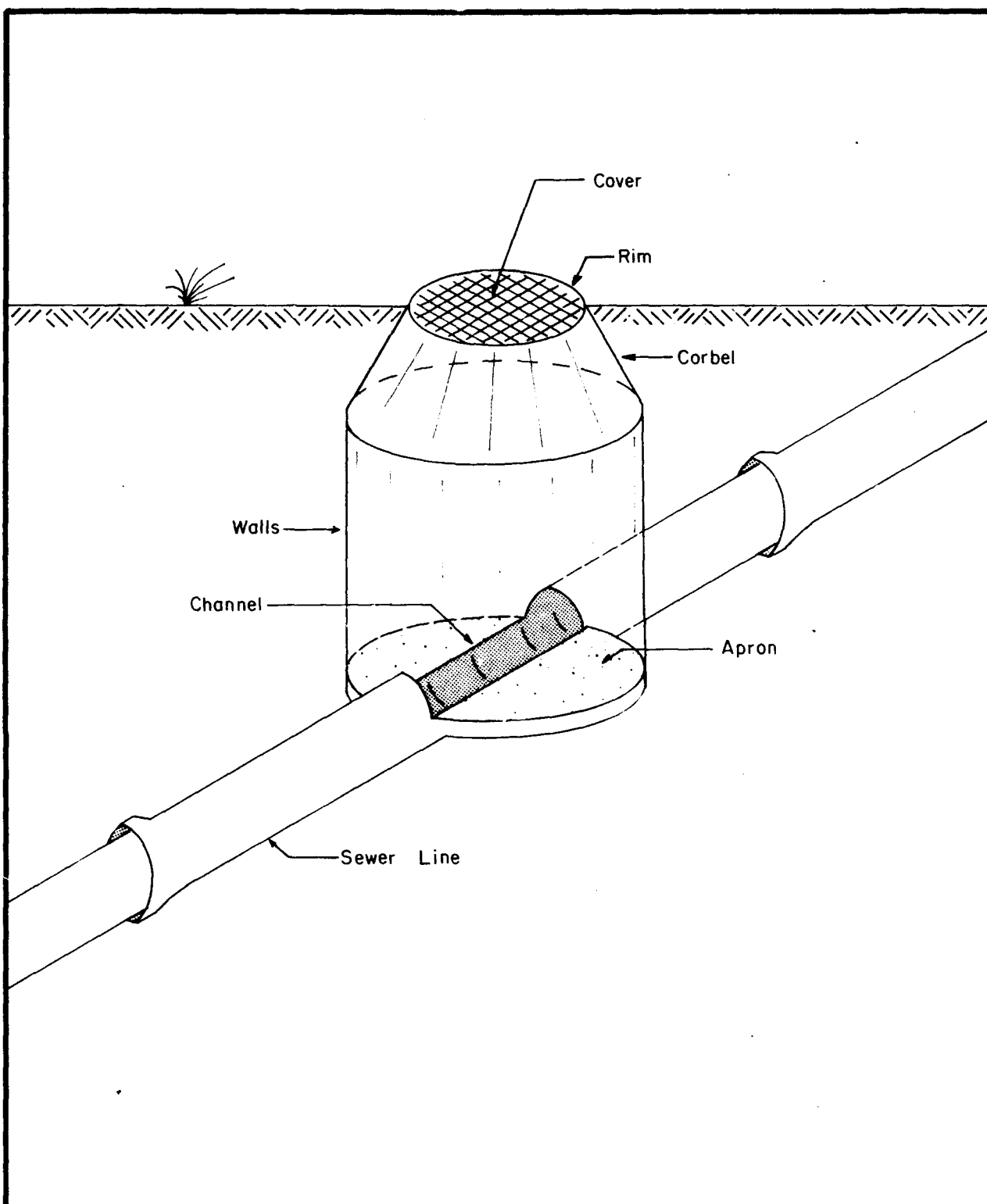
1.0 PHYSICAL SETTING

1.1 LOCATION AND DESCRIPTION

The North Plants chemical sewer is located within the North Plants complex in Section 25 and the northern half of Section 36 on the Rocky Mountain Arsenal (RMA). At present, the North Plants chemical sewer system is inactive. In Section 25, the chemical sewer system is composed of a cast iron pipe (CIP) collection network that transported chemical waste from the Army facilities to an 80,000 gallon sump, Building 1727, where the wastes were neutralized with caustic (Way, 1985). From Building 1727, neutralized waste was pumped south to Manhole 5-4 in Section 36 through pressurized CIP and steel lines. A vitrified clay pipe (VCP) sewer line that extended from Manhole 5-4 west to Manhole 1-4 conveyed waste by gravity to the chemical sewer interceptor line and then to Basin F. The chemical sewer interceptor line and the VCP line west of Manhole 5-1 were removed by the Army in 1982 (RMACCPMT, 1984/RIC 84034R01). The North Plants chemical sewer now terminates at Manhole 5-1 in Section 36. A general map that shows the location of the North Plants chemical sewer system is presented in Figure CS-NP-1. A detailed layout of the North Plants chemical sewer is shown in Plate CS-NP-1.

The North Plants chemical sewer system presently includes approximately 8,900 feet (ft) of 1 inch to 6 inch CIP, 4,100 ft of 12 inch steel pipe, and 2,000 ft of 8 inch VCP (COE, 1957; COE, 1984). Four manholes constructed of brick and mortar are located on the VCP portion of the sewer line. Manhole materials were verified during field operations. A schematic of a typical manhole, including the rim, corbel, apron, channel, and walls, is presented in Figure CS-NP-2. Buildings and facilities in the North Plants area that are connected to the chemical sewer system are listed in Table CS-NP-1.





Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

8/10/87

FIGURE CS-NP-2

Typical Manhole Configuration

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

Table CS-NP-i
North Plants Area Buildings
Connected to the Chemical Sewer

Page 1 of 2

<u>Building</u>	<u>Building Description and Use</u>
1402	Tank Farm containing 24 above-ground tanks on concrete supports. Tanks stored methylphosphonic dichloride (dichloro), which was used in GB* production.
1403	Tank Farm containing 14 above-ground tanks on concrete supports. Tanks stored fuel oil for incinerators and boilers. In addition, Buildings 1404, 1405, 1502, 1507, and 1508 are part of Tank Farm 1403.
1404	One 18,000 gallon tank used to store carbon tetrachloride (used as a wash solution for equipment).
1405	Two 18,000 gallon tanks used to store or neutralize (with caustic) hydrochloric acid.
1501	GB manufacturing and demilitarization.
1502	Six 18,000 gallon tanks used to store isopropyl alcohol.
1503	Caustic air stack scrubber building with sump.
1506	Ten 10,000 gallon underground bulk GB agent storage tanks.
1507	One 18,000 gallon tank used to store methyl alcohol.
1508	One 10,000 gallon tank used to store tributylamine (stabilizer).
1509	Isopropanol dehydration unit.
1601	GB munition filling plant, bomb shell degreasing, and demilitarization; demilitarization of phosgene-filled munitions. Houses instrument laboratory.
1601A	GB ton container unloading facility.
1603	Underground plant air stack scrubber.
1606	GB munition building and demilitarization; microgravel mines production.

* GB - an organophosphorous nerve agent

Table CS-NP-1 (Continued)

Page 2 of 2

Building	Building Description and Use
1703	Warehouse and maintenance building. Used for demilitarization and salt drying; dried brine from 80,000 gallon waste sump, Building 1727.
1704	Compressed air plant.
1727	80,000 gallon industrial waste sump that received all chemical waste from North Plants operations.

1.2 GEOLOGY

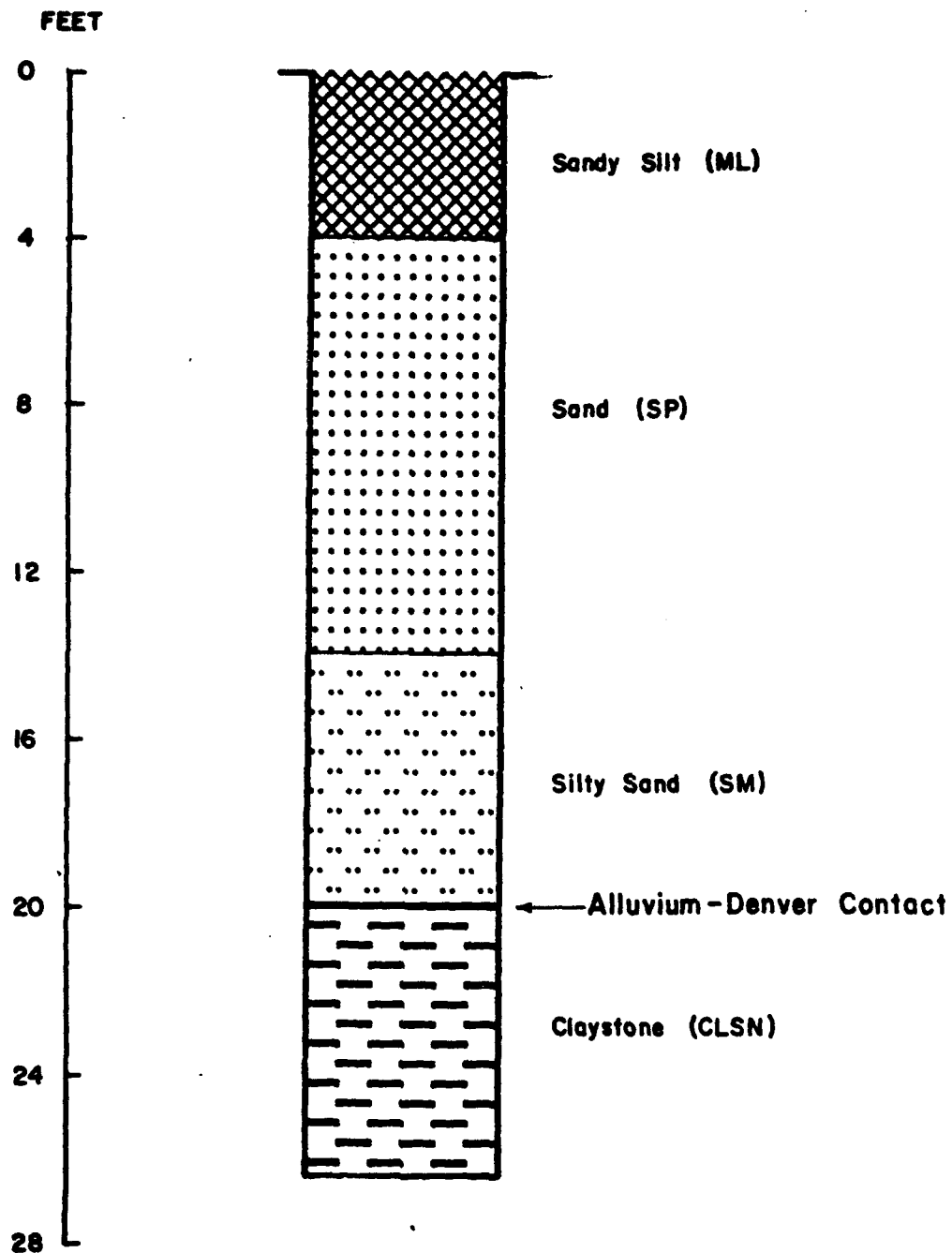
The uppermost stratigraphic units beneath the North Plants chemical sewer system are Quaternary alluvium and the Denver Formation (May, 1982/RIC 82295R01). Task 42 Phase I borings and existing monitoring wells in Section 25 show that the alluvial thickness ranges from 3 ft in Wells 25034 and 25036 to 48.5 ft in Well 25023 (not shown on plates) located approximately 1,700 ft west of Well 25021. A bedrock high covered by less than 3 ft of alluvium forms a hillside on the western side of the North Plants area. Locally the bedrock is exposed in ditches. Coarser sands are generally present at the base of the alluvium in the North Plants area, grading upward into silty sands, then to silty sand with clay, and finally to clayey sand with silt. In Section 36, the alluvium in the vicinity of the chemical sewer has a thickness ranging from 17.5 ft (Well 36122, not shown on plates, located approximately 1,100 ft south-southeast of Well 25038) to 33 ft (Well 36081) and is composed primarily of silty sand and sand with lesser clay. Figure CS-NP-3 shows a typical alluvial profile in the vicinity of the chemical sewer in Section 36 (Well 36090).

The underlying Denver Formation bedrock is composed of claystone, sandy claystone, and sandstone with lesser lignite. The Denver Formation was penetrated by a deep disposal well in Section 26, in which the formation has been interpreted to have a thickness of 250 to 300 ft. A detailed description of the Denver Formation is found in a study by May (1982/RIC 82295R01).

1.3 HYDROLOGY

Surface elevation in the vicinity of the chemical sewer varies from a high of approximately 5,230 ft above mean sea level (msl) in the southwestern corner, to a low of approximately 5,200 ft msl in the northeastern corner. Along the southern portion of the chemical sewer line, which carried waste toward Basin A, the surface elevation varies from approximately 5,225 ft msl to 5,250 ft msl.

Surface water in the vicinity of the North Plants chemical sewer generally flows north and east toward First Creek. Run-off in the North Plants complex, and from the portion of the line from the complex to Manhole 5-4, flows



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

FIGURE CS-NP-3

Field Boring Profile for Well 36090

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

northeast to First Creek. Surface water from the western portion of the line, which includes Manholes 5-1 to 5-3, flows south and then west to ditches draining into Basin B and Sand Creek Lateral (Plate CS-NP-2). Surface water samples were taken from First Creek, east of the North Plants complex and no analytes were detected (ESE, 1986b/RIC 86317R01).

In the vicinity of the North Plants chemical sewer, alluvial groundwater generally flows to the north-northeast (Plate CS-NP-3). In the northern portion of Section 36, groundwater flows in several directions. A major component of flow is channelled to the northwest, through Basin A Neck, an alluvial-filled bedrock paleochannel located in the northeastern corner of Section 35 and the northwestern corner of Section 36. The alluvium on either side of this channel is unsaturated. Lesser components of groundwater flow in this area are to the north and northeast. Borings drilled under ongoing Task 42 (Ebasco, 1987a/RIC 87336R01) show that the depth to groundwater beneath the central part of North Plants ranges from approximately 48 ft below the ground surface (5,170.7 ft msl) in Boring 6B on the northwestern side of the complex to approximately 18.5 ft (5,180.8 ft msl) in Boring 42 on the southeastern side. Depth to groundwater in Well 36090, which is within 100 ft of sampled trenches as part of the Task 10 activities (shown on Plate CS-NP-1), was measured at 5,230 ft msl in March 1986 (ESE, 1986b/RIC 86317R01). The elevation is approximately 14 ft below the level of the pipe in Trench MKE 11, and 21 ft below the pipe in Trench MKE 22.

Groundwater quality samples collected in January 1986 from upgradient Well 36082 contained isodrin, dichlorodiphenyltrichloroethane, diisopropylmethyl phosphonate, 1,4-oxathiane, 1,4-dithiane, p-chlorophenylmethyl sulfide, p-chlorophenylmethyl sulfone, p-chlorophenylmethyl sulfoxide, m-xylene, chloroform, 1,2-dichloroethane, and trichloroethylene (ESE, 1986b/RIC 86317R01). Historic groundwater data collected between 1976 and 1986 (USATHAMA, 1976-1986) show that downgradient of the North Plants complex, dimethylmethyl phosphonate was detected in Wells 24081, 24084, 24085, 25018, and 25019, chloroform in Well 24081, carbon tetrachloride in Well 24081, dibromochloropropane in Wells 24124 and 24083, organochlorine pesticides in

Well 24124, and p-chlorophenylmethyl sulfide, - sulfoxide, and - sulfone in Well 24124.

Because these compounds are representative of the class of chemicals typically used in the manufacturing and demilitarization operations at North Plants and of those chemicals disposed in Basin A and other disposal sites in Section 36, the presence of these compounds in the groundwater downgradient of North Plants does not indicate that the sewer line is contributing to groundwater contamination. Pesticide-related compounds probably are not related to North Plants operations.

2.0 HISTORY

Information on the history of the North Plants chemical sewer was gathered through a search of the literature and of the Shell I, Shell II, and Juris computer databases. Aerial photographs were not reviewed because this is a buried system.

The North Plants complex was designed and constructed by the Army from 1950 to 1952 for the manufacturing of the nerve agent isopropylmethane-fluorophosphonate, called sarin (GB); filling GB munitions; assembly of cluster bombs; and storage of GB, feedstock chemicals, and munitions. Later, the GB facility was used for the following:

- o Phosgene demilitarization from 1965 to 1967 (MF RSA015 F 1959, 1975-1977; MF RMA067 F 0636);
- o Microgravel mine production from 1967 to 1968 (MF RSA001 F 1944-45);
- o M-34 cluster demilitarization from October 1973 to November 1976 (MF RMA100 F 0485, 0488, and 0542);
- o Demilitarization of GB stored in underground tanks from September 1974 to November 1974 (MF RMA106 F 2292-97; MF RMA003 F 1330);

- o Demilitarization of GB stored in ton containers from March 1975 to February 1976 (MF RMA106 F 2292-97);
- o Honest John demilitarization from October 1976 to November 1976 (MF RMA106 F 2292-97);
- o Pilot test program for demilitarization of chemical agent identification sets (CAIS) from September 1977 and October 1978 to December 1979 (MF RMA028 F 0502; MF RMA034 F 0720);
- o Demilitarization of chemical agent identification sets (CAIS) from May 1981 to December 1982 (MF RMA116 F 0810);
- o Demilitarization of DDT-contaminated small arms munitions from January 1983 to June 1983 (MF RMA030 F 0793; MF RIA037 F 0209-0210);
- o Demilitarization of adamsite (DM) from June 1983 to June 1984 (MF RMA153 F 1935; MF RMA117 F 1298).

The North Plants chemical sewer consists of three major parts; a cast iron collection network, a contaminated waste sump (Building 1727), and chemical sewer trunk lines from the sump to disposal basins.

The cast iron collection network was built by the Army in 1952 as part of the original complex. This network collects waste from the GB processing, filling, and demilitarizing facilities, and from the raw material tank farms. In 1971 the cast iron lines from Building 1501 and the Building 1503 sump to Building 1727 were replaced with glass lined pipe (DOA, 1971).

The chemical waste sump, Building 1727, was also built by the Army in 1952 and was the point of discharge for the cast iron collection system (Vitro, 1951; COE, 1957). Caustic solution and water were added to the sump to neutralize potential Army agent contamination (Barbieri, 1987). From 1952 to 1973 neutralized waste was pumped from the sump to disposal Basins A or F. During demilitarization operations from 1973 to 1976, sump wastes were tested to

certify that they were not contaminated by nerve agents before they were pumped to Basin F. Chemical wastes were pumped to Building 1703 to be spray dried into salts (Watson, 1974; Mack, 1985). The salts were drummed and later taken to an EPA-approved site in Utah (DeCet, 1987). After 1976, all wastes collected in the sump were disposed through the Building 1703 spray dryers (Mack, 1985). In 1982, wastewater of unknown composition was hauled from the South Plants manufacturing complex to Building 1727 (Heim, 1985).

Two pressurized discharge lines transported the neutralized waste from Building 1727 to the disposal basins. Initially the sump was equipped with a 6 inch cast iron pipe, which discharged waste into the unlined disposal pond, Basin A in Section 36 (USAEHA, 1965). In 1956, an asphalt-lined pond (Basin F) was constructed in Section 26 and a chemical interceptor line was installed from South Plants to Basin F (RMA 1975/RIC 81320R05). The North Plants chemical sewer in Section 36 was joined to the chemical sewer interceptor line in Section 35 at Manhole 1-4 by an 8 inch VCP line and four manholes, 5-1 to 5-4. Manhole 5-4 is located at the discharge end of the 6 inch CIP from North Plants. Sometime between 1953 and 1961, a 12 inch steel discharge line was installed to connect the sump, Building 1727, to Manhole 5-4 (Vitro, 1951). In 1982, the chemical interceptor line between South Plants and Basin F was removed, including a portion of the North Plants chemical sewer downstream of Manhole 5-1 (RMACCPMT, 1984/RIC 84034R01).

3.0 FIELD INVESTIGATION

3.1 PREVIOUS INVESTIGATIONS

Two soil types are found in the vicinity of the North Plants chemical sewer system (USDA, 1974/RIC 81266R54). Soils in the western side of North Plants and the southwestern portion of Section 24 are of the Platner-Ulm-Renohill Association, which consists of well drained, loamy soils that formed on uplands in alluvium on interbedded shale and sandstone. To the east and north of this area, along First Creek, soils are of the Alluvial Land Association. This association consists of nearly level poorly drained to well drained loamy and sandy soils that formed in stream and river deposits. There were no soil contamination studies conducted in the area of the North Plants sanitary sewer prior to the current study. Soil contamination of the entire North Plants

complex was addressed by the Task 42 investigations (Ebasco, 1987a).

Although there have been no previous studies of soils in the North Plants area, there have been studies specific to the condition and operation of the chemical sewer system. A study was initiated in 1955 to determine the most economical method of reducing the possibility of groundwater contamination from chemical wastes generated at RMA (Parsons, 1955). As part of this study, waste stream sources and volumes were determined for different areas on RMA. An instantaneous water use of 850 gpm was measured during a peak operating period in June, 1955 in the North Plants area (referred to as "Chemical Corps Plant No. 1"). The brines discharged from the scrubbers were kept dilute (about 5 percent by weight) to avoid plugging the scrubbers. It was expected that the scrubbers alone would generate a stream of about 300 gpm.

In 1960, a study was undertaken to investigate sources of waste generated at RMA, the volume of flow to Basin F, and the composition of the waste (USAEHL, 1960). It was found that during normal operations, the primary waste stream from the North Plants manufacturing complex averaged about 100 gallons per minute (gpm). Fifty gpm came from manufacturing, 25 gpm came from shell-filling operations, and 25 gpm came from operation of charcoal filter scrubbers and maintenance shops. The manufacturing waste streams consisted primarily of caustic (sodium hydroxide), with 15 percent sodium chloride, dichlor, alcohol, hydrogen fluoride, and possibly GB by-products.

Another study was undertaken in 1965 to determine the physical and chemical characteristics of liquid wastes entering the industrial waste disposal system at RMA (USAEHA, 1965). During the study no manufacturing was being done in the North Plants complex, but GB was being redistilled and munitions were being filled with GB and VX, a nerve agent, there. The wastes generated were primarily hydrolysis products of the chemical agents, caustic solution, and washdown water. The total average waste flow was approximately 3 gpm. It was also noted that off-standard batches of agent were neutralized with chlorine and caustic before going to Building 1727. This sump (1727) was investigated under Task 30 by Environmental Science and Engineering (ESE).

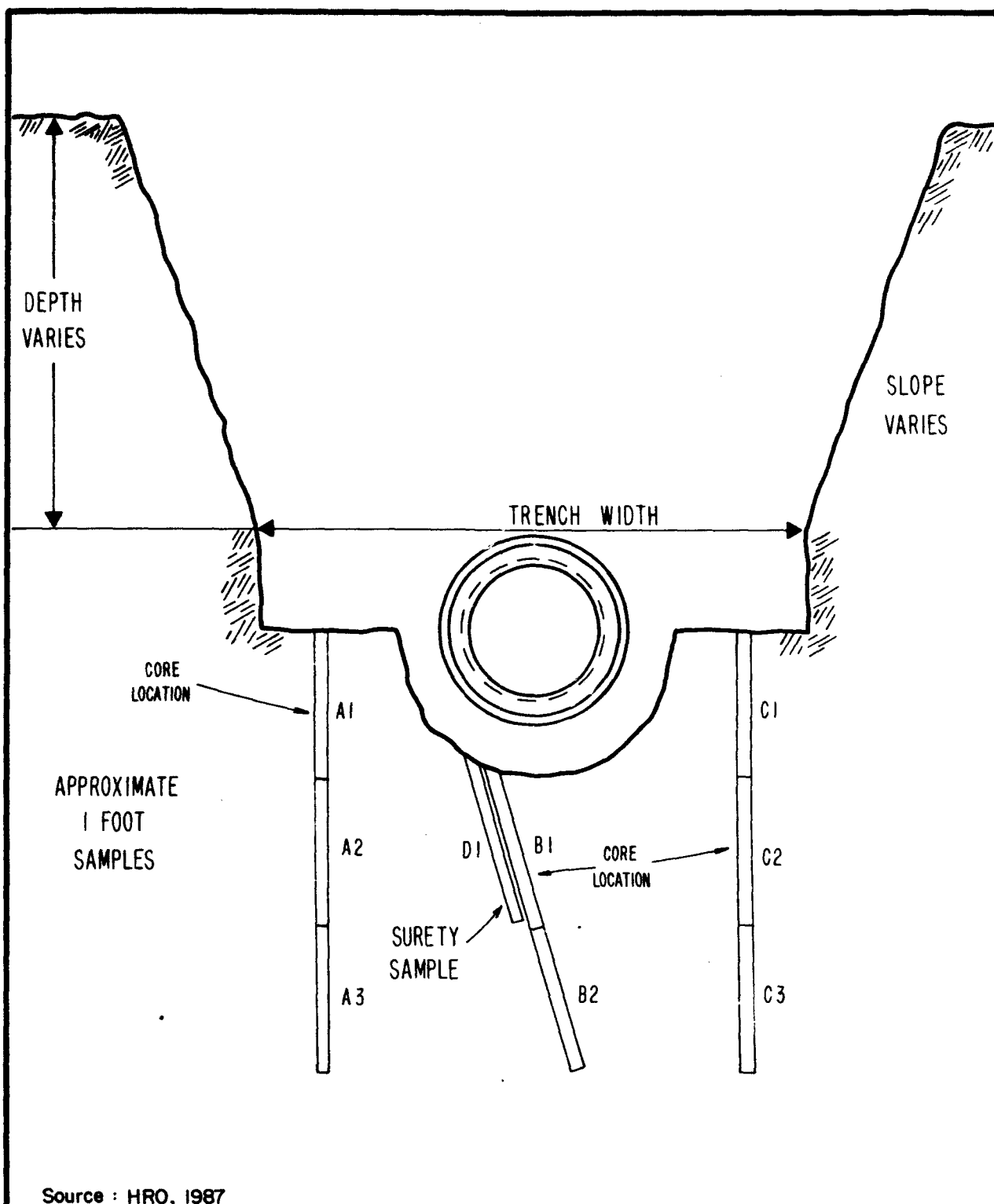
The integrity of the chemical waste interceptor line feeding into Basin F was questioned in a 1975 report (RMA, 1975/RIC 81320R05). In 1976, an attempt was made to generate a rough flow balance of the contaminated waste system at RMA to determine if flow was being lost on the way to Basin F (RMA, 1976/RIC 81339R21). In the North Plants area, operations were far below design capacity and pumping to Basin F was only being done on an "as required" basis. Pumping operations were determined by the level of liquid in the contaminated sump, Building 1727, and were controlled by boilerhouse personnel. Data collected show that the pumps were run about every other day for 5 hours. The study found evidence of infiltration into the chemical sewer system when flow was detected at the farthest downstream metering station at a time when the pumps in the contaminated sump were not operating. Recent rains were believed to have produced the infiltration.

Potential soil and groundwater contamination at the North Plants complex is currently being investigated under Task 42 (Ebasco, 1987a).

Shell Oil Company, through their consultant Morrison-Knudsen Engineers, Inc. (MKE), conducted investigations of the sewers at RMA prior to the PM-RMA studies. As part of their study, MKE excavated two trenches, 11 and 22, along the VCP portion of the chemical sewer in Section 36 just south of North Plants. A schematic drawing showing the boring grid used during the drilling program is presented in Figure CS-NP-4 and the trench locations are presented on Plate CS-NP-1. The analytical results are described briefly below and are summarized in Tables CS-NP-2 and CS-NP-3 (HRO, 1987).

Trench MKE 11

Seven samples were collected from Trench MKE 11 and were analyzed for volatile and semivolatile organic compounds, arsenic, and mercury. Methylene chloride was identified twice at concentrations of 2.9 and 2.2 micrograms per gram (ug/g). Diisopropylmethyl phosphonate (DIMP) was detected in all seven of the samples at concentrations ranging from 0.5 to 0.9 ug/g. No arsenic was detected and mercury was found once at 0.68 ug/g in the first sample taken from under the pipe.



Source : HRO, 1987

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 1/14/88

FIGURE CS-NP-4

Sampling Grid Used by MKE

Rocky Mountain Arsenal, Task 10
Prepared by: Ebasco Services Incorporated

Table CS-WP-2. Results of MSE Sewer Investigation: Chemical Sewer - North Plants. Page 1 of 2.

Sample	Trench MSE 11*						
	A1	A2	A3	B1	B2	C1	C2
SOIL CHEMISTRY							
<u>Volatiles (ug/g)</u>							
Methylene chloride	BDL	BDL	BDL	2.9	2.2	BDL	BDL
<u>Semivolatiles (ug/g)</u>							
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Diisopropylmethyl phosphonate	0.9	0.8	0.7	0.6	0.5	0.7	0.6
<u>ICP Metals (ug/g)</u>							
As	NA	NA	NA	NA	NA	NA	NA
<u>Arsenic (ug/g)</u>							
As	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>Mercury (ug/g)</u>							
Hg	BDL	BDL	BDL	0.68	BDL	BDL	BDL

BDL - Below detection limit
 NA - Not analyzed
 * - Results for 12 of the 24 semivolatile analytes were not recorded
 Source: HRO, 1987

5061A/1052A
 Rev. 8/24/88

Table CS-WP-2. Results of MSE Sewer Investigation: Chemical Sewer - North Plants. Page 2 of 2.

Sample	Trench MSE 22						
	A1	A2	A3	B1	B2	C1	C2
SOIL CHEMISTRY							
<u>Volatiles (ug/g)</u>							
Methylene chloride	5.2	5.5	4.4	4.6	4.4	6.7	6.0
<u>Semivolatiles (ug/g)</u>							
Aldrin	BDL	BDL	BDL	0.64	BDL	BDL	BDL
Diisopropylmethyl phosphonate	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>ICP Metals (ug/g)</u>	NA	NA	NA	NA	NA	NA	NA
Arsenic (ug/g)	BDL	2.5	BDL	BDL	BDL	BDL	BDL
Mercury (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit
 NA - Not analyzed
 Source: HRO, 1987

5061A/1052A
 Rev. 8/24/88

Table CS-NP-3. Tentative Identification of Nontarget Compounds - MKE Data. Page 1 of 3.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
11	A1	535	0.6	C7 alcohol
		557	0.6	hydrocarbon
		613	0.4	phthalate
		669	0.3	phthalate
		103	1.8	butanoic acid, methyl ester
11	A2	535	0.5	C7 alcohol
		557	0.6	hydrocarbon
		613	0.8	phthalate
		103	1.1	butanoic acid, methyl ester
11	A3	535	0.3	C7 alcohol
		557	0.5	hydrocarbon
		613	0.7	phthalate
11	B1	535	0.4	C7 alcohol
		548	0.5	hexanoic acid
		557	0.6	hydrocarbon
		660	0.9	adipate ester
		094	2.1	C6 aliphatic compound
		103	5.6	butanoic acid, methyl ester
11	B2	535	0.4	C7 alcohol
		557	0.6	hydrocarbon
		613	0.4	phthalate
11	C1	535	0.4	C7 alcohol
		557	0.6	hydrocarbon
		613	1.2	phthalate

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0094U/0185A

Rev. 2/25/88

Table CS-NP-3. Tentative Identification of Nontarget Compounds - MKE Data. Page 2 of 3.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
11	C2	535	0.4	C7 alcohol
		557	0.6	hydrocarbon
		613	0.6	phthalate
		095	3.7	C6 aliphatic
		098	2.7	aromatic amine
		103	3.2	carboxylic acid, ester
22	A1	520	0.2	methyl cyclohexane
		612	1.0	phthalate ester
		622	17	oxygen substituted alkene
		623	2.7	oxygen substituted alkene
		104	1.5	hexane
22	A2	520	0.4	methyl cyclohexane
		612	1.1	phthalane ester
		622	22	oxygen substituted alkene
		104	1.4	hexane
22	A3	520	0.3	methyl cyclohexane
		611	0.4	hexadecanoic acid
		612	1.1	phthalate ester
		622	11	oxygen substituted alkene
		104	2.5	hexane
22	B1	519	0.4	methyl cyclohexane
		612	1	phthalate ester
		622	9.2	oxygen substituted alkene
		622	1.1	oxygen substituted hydrocarbon
		104	2.7	hexane

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0094U/0185A

Rev. 2/25/88

Table CS-NP-3. Tentative Identification of Nontarget Compounds - MKE Data. Page 3 of 3.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
22	B2	612	1.4	phthalate ester
		622	8.8	oxygen substituted alkene
		622	1.2	oxygen substituted hydrocarbon
		104	2.3	hexane
22	C1	519	0.3	methyl cyclohexane
		612	1.2	phthalate ester
		622	9.3	oxygen substituted alkene
		622	1.3	oxygen substituted hydrocarbon
		104	1.2	hexane
22	C2	523	9.7	cyclohexane
		550	0.2	chlorinated hydrocarbon
		611	0.5	hexadecanoic acid
		612	1.3	phthalate ester
		622	9.7	oxygen substituted alkene
		622	1.7	oxygen substituted alkene
		688	0.2	phthalate ester
		039	1.2	2-propanone
		068	9.1	2-butanone
		086	1.8	3-methyl-2-butanone
		095	2.9	3-pentanone
		159	3.0	hexamethyl-cyclotri-siloxane
22	C3	520	0.2	methyl cyclohexane
		554	0.3	methyl phosphonic acid (ester)
		612	1.2	phthalate ester
		622	5.2	oxygen substituted alkene
		622	0.9	oxygen substituted alkene
		671	0.2	phthalate ester
		104	1.5	hexane

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)
 2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0094U/0185A
 Rev. 2/25/88

Analysis for nontarget compounds found low levels of compounds tentatively identified as hydrocarbons, alcohols, acids, esters, amines, and phthalates, with concentrations ranging from 0.3 to 5.6 ug/g.

Trench MKE 22

Trench MKE 22 yielded eight samples from three borings, one on each side of the pipe and one from under the pipe. Results from the volatile organic analysis showed methylene chloride present in all eight samples at concentrations ranging from 4.4 to 6.7 ug/g. No method blank data were supplied, but because methylene chloride is a common laboratory solvent, its presence at this relatively constant level in all samples may be an indication of laboratory background. Results obtained from the semivolatile analysis showed aldrin at a concentration of 0.64 ug/g in the sample taken from directly under the pipe. Arsenic was detected in two samples at 2.3 and 2.5 ug/g, and no mercury was detected.

Several nontarget compounds were noted, the most common being those tentatively identified as phthalate ester, methyl cyclohexane, hexane, oxygen-substituted alkene and hydrocarbon, cyclohexane, propanone, and butanone. Concentrations were generally low, less than about 2.5 ug/g. The exceptions to this were the oxygen-substituted alkene (0.9 to 22 ug/g), cyclohexane (9.7 ug/g), hexane (1.2 to 2.7 ug/g), 2-butanone (9.1 ug/g), 3-pentanone (2.9 ug/g), and hexamethyl-cyclotri-siloxane (3.0 ug/g).

3.2 FIELD SURVEY

3.2.1 Field Program

Using the methodology presented in the Task 10 Technical Plan (Ebasco, 1987b), the field investigation program for the North Plants chemical sewer system consisted of a manhole reconnaissance survey, observation of MKE trenching operations, and sample collection in MKE trenches. Hydrostatic testing of the 6 and 12 inch pressure lines originating at Building 1727 was not done at the request of the Facilities Engineer. No geophysical clearance of the sampling locations was conducted for safety purposes as there was no likelihood of encountering unexploded ordnance, buried metal, or other buried objects.

Four manholes in the system were inspected, Manholes 5-4, 5-3, 5-2, and 5-1. These are located along the VCP portion of the pipe in Section 36. There are no manholes along the chemical sewer in the main manufacturing area of North Plants. Manhole 5-1 is filled with concrete. The other manholes inspected are square vaults constructed of brick and mortar and are in good condition. The inlet to Manhole 5-4 is the 12 inch steel force main originating in North Plants, and the outlet is vitrified clay pipe. Both pipes are slightly above the level of the vault floor, and there is no invert channel. Approximately 20 ft to the west of Manhole 5-4 is a manhole containing a v-notch weir, and to the north (approximately 12 ft) is an air release valve. Manholes 5-3 and 5-2 have completely enclosed pipes running through them and contain several inches of sediment saturated with what was assumed to be water. Results of the manhole survey are summarized in Table CS-NP-4.

During the reconnaissance survey, Building 1727, the sump and pump station, was also inspected. The sump was full of water and appeared to be in fair condition, with significant deterioration of the outer portions of the concrete. There are two lines, 6 inches and 12 inches in diameter, exiting the pump station. The 12 inch line empties into Manhole 5-4. The terminus of the 6 inch line is unknown, but it is assumed to have been plugged when the 12 inch line was installed.

Two trenches, numbered 11 and 22, were excavated in Section 36 by MKE. Trench MKE 11 was located approximately 20 ft upstream of Manhole 5-2, and Trench MKE 22 was located downstream of Manhole 5-4. Each trench exposed four sections of pipe and three joints. The pipe consisted of 4 ft sections of vitrified clay pipe with bituminous joint material. The exposed pipe was in generally good condition with rare hairline cracks. Samples were collected from beneath the exposed joints for chemical and physical analysis in each trench. The distribution of analytes detected within or above their indicator levels and the boring grid locations in the trenches are presented in Figures CS-NP-6a and 6b, Section 3.2.4 of this report.

Table CS-WP-4. Manhole Reconnaissance Survey Observations. Page 1 of 1.

Manhole	Depth	Material	Rim	Walls	Apron	Channel	Connections	Comments
5-1			no problems noted					filled with concrete
5-2	7 ft	brick	no problems noted	no problems noted	no problems noted	no channel	no problems noted	pipe runs through manhole with no opening; standing water 3 inches deep
5-3	4 ft	brick	no problems noted	no problems noted	no problems noted	no channel	no problems noted	pipe runs through manhole with no opening standing water and sediment several inches deep
5-4	5.7 ft	brick	no problems noted	no problems noted	soft in center	no channel	no problems noted	

Locations along the chemical sewer were investigated during the fall of 1986. A total of 8 borings, yielding 6 samples for chemical analysis and 2 samples for physical analysis, were completed along the North Plants chemical sewer line as follows:

<u>Trench</u>	<u>Boring No.</u>	<u>Depth From Ground Surface (ft)</u>	<u>Depth Beneath Sewer Invert (ft)</u>	<u>No. of Samples</u>
MKE 11	1	5.6	0.6	1
(Trench depth =5 ft)	2	6.1	1.1	1
	3	5.8	0.8	1
	Physical	5.5	0.5	1
MKE 22	1	6.1	1.1	1
(Trench depth =5 ft)	2	6.0	1.0	1
	3	6.7	1.7	1
	Physical	5.9	0.9	1

Samples for chemical analysis were analyzed by gas chromatography/mass spectrometry (GC/MS) for semivolatile organics; by an inductively coupled argon plasma (ICP) screen for metals; and by separate analysis for arsenic and mercury. Samples were not analyzed for volatile organics because the soil in the trenches had been exposed to the atmosphere. Volatile organic compounds could have escaped by the time the samples were collected. Appendix CS-A presents the specific target analytes for which laboratory analyses were conducted. A summary of the results of these analyses is presented in Table CS-NP-5, Section 3.2.4 of this report. Physical samples were analyzed for fluid content, density, compaction, and grain size distribution. Results from these analyses were used to determine if the pipe and bedding material were properly designed and installed.

3.2.2 Field Observations

In situ air monitoring was conducted during drilling operations for safety purposes using a photoionization detector (HNU). All in situ volatile organic readings were recorded at background levels. The results of the volatile organic readings in the borehole at the sampled depths are presented in Table CS-NP-6, Section 3.2.4 of this report.

An M18A2 test kit was used to monitor for the presence of chemical agents in the borehole and samples according to standard operating procedures. The

M18A2 is used as a backup test if an M8 alarm is triggered, as a substitute for an M8, and as a specific check for the presence of mustard. The M18A2 detects G agents, V agents, all forms of mustard, and lewisite. Specifically at RMA, the M18A2 test kit is used to detect GB (sarin), VX, H (mustard), HD (distilled mustard), and L (lewisite), based upon the knowledge that these agents were manufactured, stored, or demilitarized at the site. The detection limit for all mustard agents is 0.5 milligrams per cubic meter (mg/m^3); the detection limit for all G agents, VX, and L, is $0.2 \text{ mg}/\text{m}^3$.

No chemical agents were detected at these locations by the M18A2 test kit. No unexploded ordnance, buried metal, or other objects were detected during drilling. No unusual coloring or staining of the core samples was noted.

3.2.3 Geophysical Exploration

No geophysical exploration of these trenches was conducted by Ebasco personnel as the trenches had already been cleared and sampled by MKE.

3.2.4 Analyte Levels and Distribution

Diisopropylmethyl phosphonate, cadmium, zinc, and mercury were detected within or above their indicator levels along the North Plants chemical sewer in Section 36. The number of samples containing each analyte, and the concentration range, median, mean, standard deviation, detection limit, and indicator range are listed in Table CS-NP-5. The results of geologic field observations, air monitoring during sampling, and the chemical analysis of each soil sample are summarized in Table CS-NP-6. A summary of results of the geotechnical analysis of each physical sample is given in Table CS-NP-7 and in Figures CS-NP-5a and 5b.

Indicator levels and ranges were established to assess the significance of metal and organic analytical values. The indicator levels are the method detection limits for organic compounds. The indicator ranges for metals reflect the concentrations expected to occur naturally in RMA alluvial soils. Selection of these ranges is discussed in the June 1986 Introduction to the Contamination Assessment Reports (ESE, 1986a).

Table CB-NP-5. Summary of Analytical Results for Chemical Sewer - North Plants. Page 1 of 1.

Constituent Detected	Number of Samples*	Concentration (ug/g)					CAL Detection Limit	Indicator Level
		Range	Median**	Mean**	Standard Deviation**	DataChem Detection Limit		
<u>Volatiles (N=0)</u>								
Not analyzed	0	-	-	-	-	-	-	-
<u>Semivolatiles (N=6)</u>								
Diisopropylmethyl phosphonate	1	1.0	-	-	-	1.0	0.3	DL
<u>ICP Metals (N=6)</u>								
Cadmium	1	1.3	-	-	-	0.74	0.66	1.0-2.0
Chromium	6	8.4-16	12	12	2.6	6.5	5.2	25-40
Copper	4	7.5-14	-	-	-	4.7	4.9	20-35
Lead	2	15-18	-	-	-	8.4	12.7	25-40
Zinc	6	36-68	53	52	11	8.7	9.5	60-80
Arsenic (N=6)	0	-	-	-	-	2.5	5.0	DL-10
Mercury (N=6)	4	.058-.63	-	-	-	0.050	0.060	DL-0.1

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate
 N - Number of samples analyzed
 * - Number of samples in which constituent was detected
 ** - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples

4968A/1052A
 Rev. 2/25/88

Table CS-WP-6. Results of Field Study. Page 1 of 1.

	MKE 111	MKE 112	MKE 113	MKE 221	MKE 222	MKE 223
Depth (feet)	4.8-5.6	5.2-6.1	4.9-5.8	5.2-6.1	5.3-6.0	5.9-6.7
Geologic Material	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Silty Sand	Sand and Clayey Silt
Percent PinesVO	30	30	30	40	35	50

AIR MONITORING

Volatile Organic Readings (ppm)

HNUS	BDL	BDL	BDL	BDL	BDL	BDL
------	-----	-----	-----	-----	-----	-----

SOIL CHEMISTRY

Volatiles (ug/g)

Not analyzed

Semivolatiles (ug/g)

Diisopropylmethyl phosphonate	1	BDL	BDL	BDL	BDL	BDL
-------------------------------	---	-----	-----	-----	-----	-----

ICP Metals (ug/g)

Cadmium	BDL	BDL	BDL	BDL	1.3	BDL
Chromium	12	13	16	8.4	10	12
Copper	14	7.9	11	BDL	BDL	7.5
Lead	BDL	15	BDL	BDL	18	BDL
Zinc	55	53	55	36	68	44

Arsenic (ug/g)

None detected

Mercury (ug/g)	0.25	0.63	.058	BDL	0.26	BDL
----------------	------	------	------	-----	------	-----

BDL - Below detection limit

BKD - Background

S - As referenced to calibration standard of benzene for HNU; reading has been adjusted to account for background level

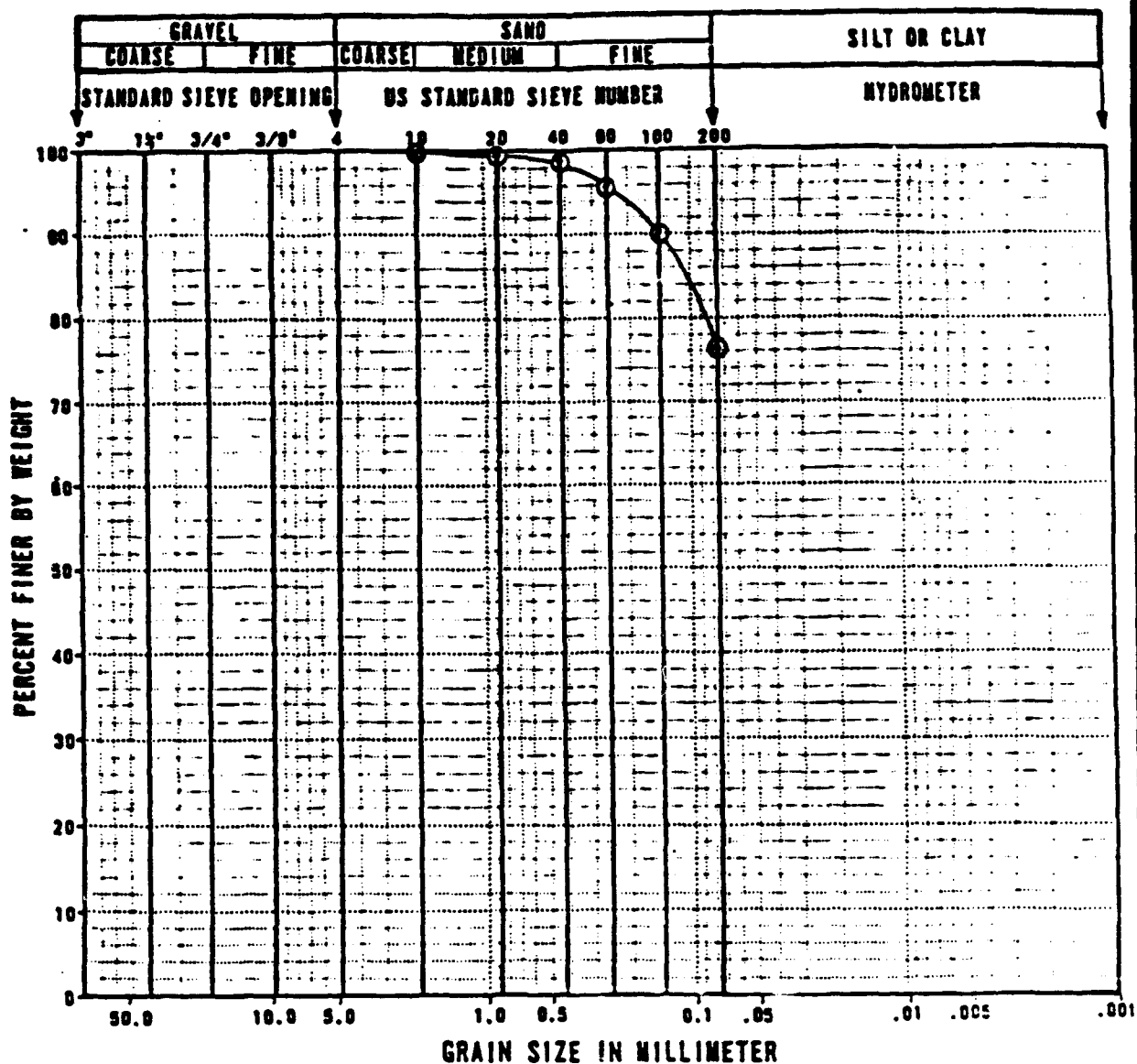
VO - As determined by visual observation and rounded to the nearest percent

4962A/1052A

Rev. 2/25/88

Table CS-NP-7. Summary of Soil Properties Indexes and Harvard Miniature Compaction Test. Page 1 of 1.

Trench No.	Boring No.	Depth (ft)	Fluid Content, %	Dry Density, pounds/cubic foot, PCF	Compacted Fluid Content, %	Compacted Dry Density, pounds/cubic foot, Pcf
MKE 11	Physical	4.6-5.5	16.5	89.5	11.0	114
MKE 22	Physical	5.2-5.9	4.0	87.0	3.5	102



Source: The Earth Technology Corporation, June 1987

Prepared for:

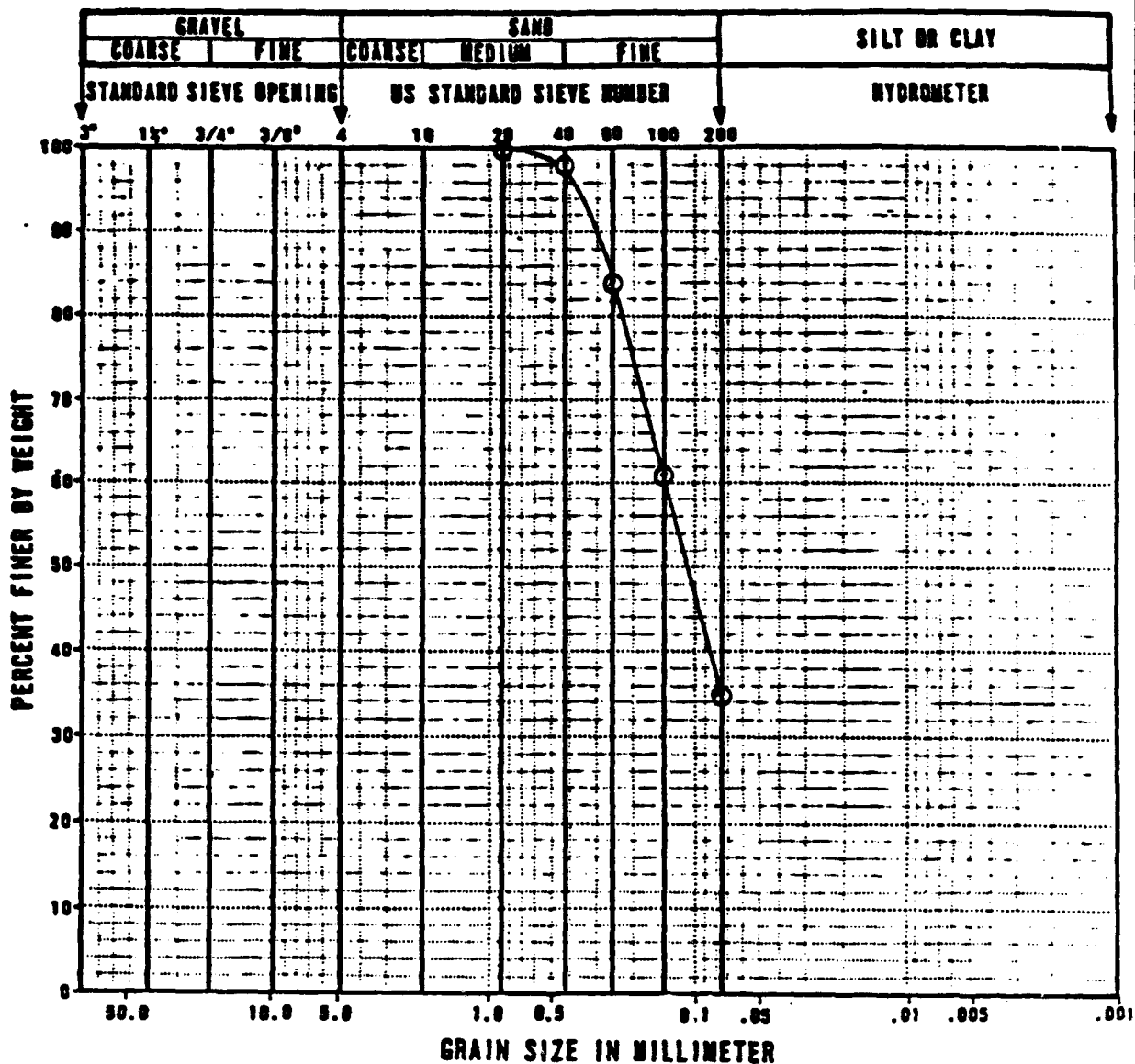
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 10/15/87

FIGURE CS - NP - 5a

Grain Size Distribution Curve
Physical Sample, 4.6 - 5.5 ft., Trench
MKE II, Section 36
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, June 1987

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 10/15/87

FIGURE CS-NP-5b

Grain Size Distribution Curve, Physical
Sample, 5.2 - 5.9 ft., Trench MKE 22,
Section 36
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

Diisopropylmethyl phosphonate was detected at a concentration of 1 ug/g in the 4.8 to 5.6 ft interval of Boring 1 of Trench MKE 11. Cadmium and zinc were detected within their indicator ranges in the 5.3 to 6.0 ft interval of Boring 2 in Trench MKE 22 at 1.3 ug/g and 68 ug/g, respectively. Mercury was detected above its indicator range in three of the six samples collected. It was detected in Trench MKE 11 in the 4.8 to 5.6 ft interval of Boring 1, and in the 5.2 to 6.1 ft interval of Boring 2 at concentrations of 0.25 ug/g, and 0.63 ug/g, respectively, and in Trench MKE 22 in Boring 2 in 5.3 to 6.0 ft interval at a concentration of 0.26 ug/g. Mercury was also detected within its indicator range in Trench MKE 11, Boring 3 in the 4.9 to 5.8 ft interval at a concentration of 0.058 ug/g. The distribution of these target analytes detected within or above their indicator levels are presented in Figures CS-NP-6a and 6b. A tabulation of all analytical data associated with this program is presented in Appendix CS-B.

In addition, several compounds were detected by GC/MS that were not included in the target compound list and that were not conclusively identified. Table CS-NP-8 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the table), concentration, sample number, lot, best-fit identification, and comments for these nontarget compounds detected in trenches along the North Plants chemical sewer. It should be noted that an individual compound may have more than one retention time, and also that a particular retention time may be assigned to more than one compound. Therefore, Table CS-NP-8 provides only a general indication of additional compounds that may be present.

An unknown hydrocarbon with more than 18 carbons, possibly an alcohol or an alkene, was tentatively identified at 0.5 parts per million (ppm) in Boring 2 of Trench MKE 11 at the 5.2 to 6.1 ft interval. In Boring 3, from Trench MKE 11 in the 4.9 to 5.8 ft interval, one compound tentatively identified as a glycol and two as propanoic acid derivatives were found at concentrations of 0.6 ppm, 0.3 ppm, and 0.5 ppm, respectively. The only other nontarget compound noted was an unknown phthalate, which was tentatively identified at a low concentration in Boring 1 of Trench MKE 22 in the 5.2 to 6.1 ft interval. No nontarget volatile organic compounds were found, as these samples were only analyzed for semivolatile organic compounds in the GC/MS analysis.

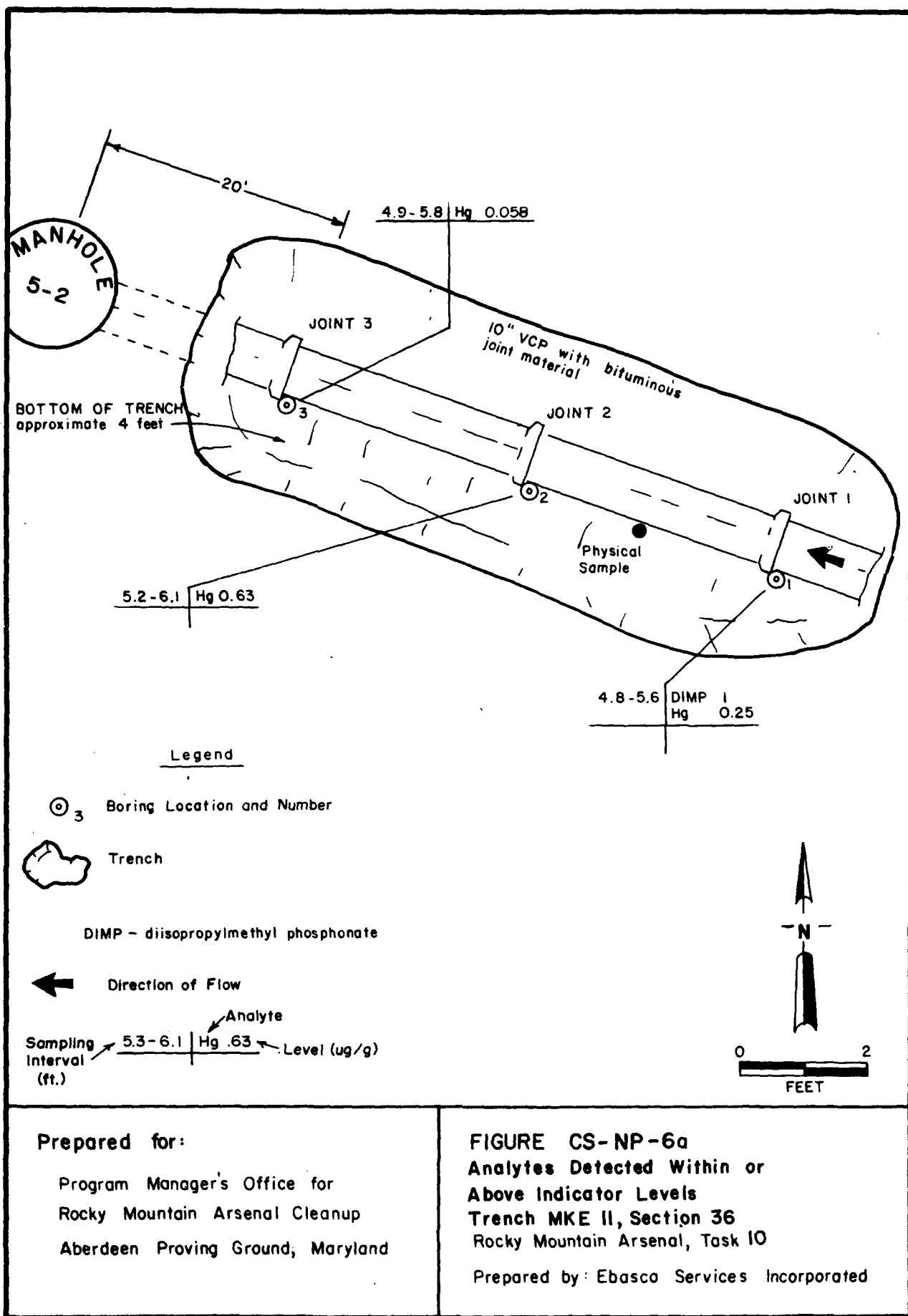


Table C8-MP-8. Tentative Identification of Nontarget Compounds. Page 1 of 1.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
NKX 111	4.8-5.6			002	BRD		K
NKX 112	5.2-6.1	635	0.5	003	BRD	unknown alcohol or alkene GT C-18	
NKX 113	4.9-5.8	532	0.6	004	BRD	possibly a glycol	
		572	0.3	004	BRD	possibly a propanoic acid derivative	
		573	0.5	004	BRD	propanoic acid, 2-methyl, 3-hydroxy-2,4,4-trimethyl pentyl ester	
NKX 221	5.2-6.1	609	0.5	005	BRD	unknown phthalate	C, F
NKX 222	5.3-6.0			006	BRD		K
NKX 223	5.9-6.7			007	BRD		K

C - Plasticizer
 F - Low concentration
 GT - Greater than
 K - None detected
 * - Values reported are blank corrected

4923A/1041A
 Rev. 1/25/88

3.2.5 Contamination Assessment

Analyses of samples collected by Ebasco from the two trenches along the North Plants chemical sewer line, in the northern part of Section 36, revealed concentrations of diisopropylmethyl phosphonate, cadmium, zinc, and mercury within or above their indicator levels. Five tentatively identified nontarget compounds of note, an alcohol (or alkene), a glycol, two propanoic acid derivatives, and an unknown phthalate were detected in these samples.

Diisopropylmethyl phosphonate was found at a low concentration (1 ug/g) in one sample taken from beneath the sewer line in Trench MKE 11. Diisopropylmethyl phosphonate, a by-product of GB nerve gas manufacture, was disposed in Basin A through the North Plants chemical sewer prior to 1957, and in Basin F from 1957 to the early 1960s (Ebasco, 1988). Trench MKE 11 is located south of the trash pits in the northern part of Site 36-17N, Task 1. Surface borings performed under Task 1, in the vicinity of Trench MKE 11, did not show signs of diisopropylmethyl phosphonate contamination (ESE, 1986c). Based on this information it appears that the North Plants chemical sewer is the source of the small amount of diisopropylmethyl phosphonate detected at this location.

Cadmium and zinc were the only metals detected at concentrations within their indicator ranges. These concentrations are consistent with those naturally occurring in alluvial materials in which they were found at RMA.

Mercury was detected above its indicator range in three of the six borings drilled along the North Plants chemical sewer. In the past, mercury has been flushed to the chemical waste sump, Building 1727, from the instrument lab located in Building 1601 (MF RMA062 F 2141-2142), and therefore may have been discharged to Basin F through the chemical sewer in Section 36.

Concentrations of mercury ranging from 0.058 ug/g to 0.63 ug/g were found in all three samples from Trench MKE 11 and in a fourth sample from Trench MKE 22. A review of Task 1 data does not indicate the presence of mercury contamination in borings located in the vicinity of the North Plants chemical sewer (ESE, 1986c). Therefore, it appears that the elevated levels of mercury found in this study originate from the chemical sewer.

The five tentatively identified nontarget compounds detected along the chemical sewer were found at a low concentrations, 0.3 ppm to 0.6 ppm. An unknown phthalate, a plasticizer, was found at a low concentration in one boring and is ubiquitous in the environment or may have originated from the sample containers. The hydrocarbon, glycol, and propanoic acid derivatives are not known to occur naturally and may have originated from the chemical sewer line.

The semivolatile method, although not certified for volatile compounds, has been shown to be capable of detecting tetrachloroethylene, toluene, chlorobenzene, ethylbenzene, and xylenes in the nontarget fraction. The absence of these compounds in the nontarget results for this site is an indication that there is no contamination present from these compounds.

Analysis of samples from the MKE field program showed methylene chloride in 10 of the 15 samples at concentrations ranging from 2.2 to 6.7 ug/g. The frequent detection of methylene chloride within a narrow concentration range may be due to laboratory contamination. Aldrin was found once, directly under the pipe at a concentration of 0.64 ug/g in Trench MKE 22. Diisopropylmethylphosphonate was found in all seven samples from Trench MKE 11 at concentrations ranging from 0.5 to 0.9 ug/g. As discussed previously, diisopropylmethyl phosphonate was disposed in Basin F through the North Plants chemical sewer from 1957 to the early 1960s.

Mercury was detected once by the MKE program at a level of 0.68 ug/g in Trench MKE 11. This corroborates mercury concentrations detected by the Ebasco field program.

Nontarget analyses detected several compounds that were tentatively identified as hydrocarbons, alcohols, acids, esters, amines, and phthalates. The alcohol, acids, esters, and phthalates are usually associated with naturally occurring compounds and are common in soils at RMA. The presence of hydrocarbons, however, may be due to the chemical sewer.

As samples were only collected from directly beneath the sewer pipe, it is difficult to accurately assess the extent of potential contaminant migration along the North Plants chemical sewer line. Based on information gathered in this study it appears that potential contamination of soils underneath the chemical sewer line is limited to mercury, aldrin, diisopropylmethyl phosphonate, and some hydrocarbons. At the time the samples were analyzed, the laboratory was not certified to test for the agent products fluoroacetic acid, isopropylmethyl phosphonate, and methylphosphonate, which are breakdown products of GB. Because the only activities in this area were GB manufacture and storage and some Army agent demilitarization, these data will eventually be needed for a complete assessment of potential contamination.

Although no samples were collected from beneath the cast iron and steel sections of pipe, the VCP sections will provide a worst-case estimate of leakage and extent of possible contaminant migration. While steel and CIP will not leak if the sections are joined properly, VCP is anticipated to leak at the joints because the pipe sections are joined with a porous material. The greatest potential for leakage along the chemical sewer line in North Plants is therefore in the VCP portion of the line.

3.3 FOLLOW-ON INVESTIGATIONS

The nature and extent of potential contamination associated with the North Plants chemical sewer have been adequately assessed to determine a worst-case estimate of potentially contaminated soil. Therefore, no follow-on investigations are recommended for the chemical sewer in the North Plants area at this time.

Although a worst-case estimate of potential contamination has been delineated, additional work may be needed as part of the Feasibility Study or design phase of remediation to more precisely define the extent of potential contamination. If the RMA Feasibility Study determines this additional information is needed, the recommended work will be completed as part of the conceptual or detailed design phase of remedial action to be conducted for the North Plants chemical sewer.

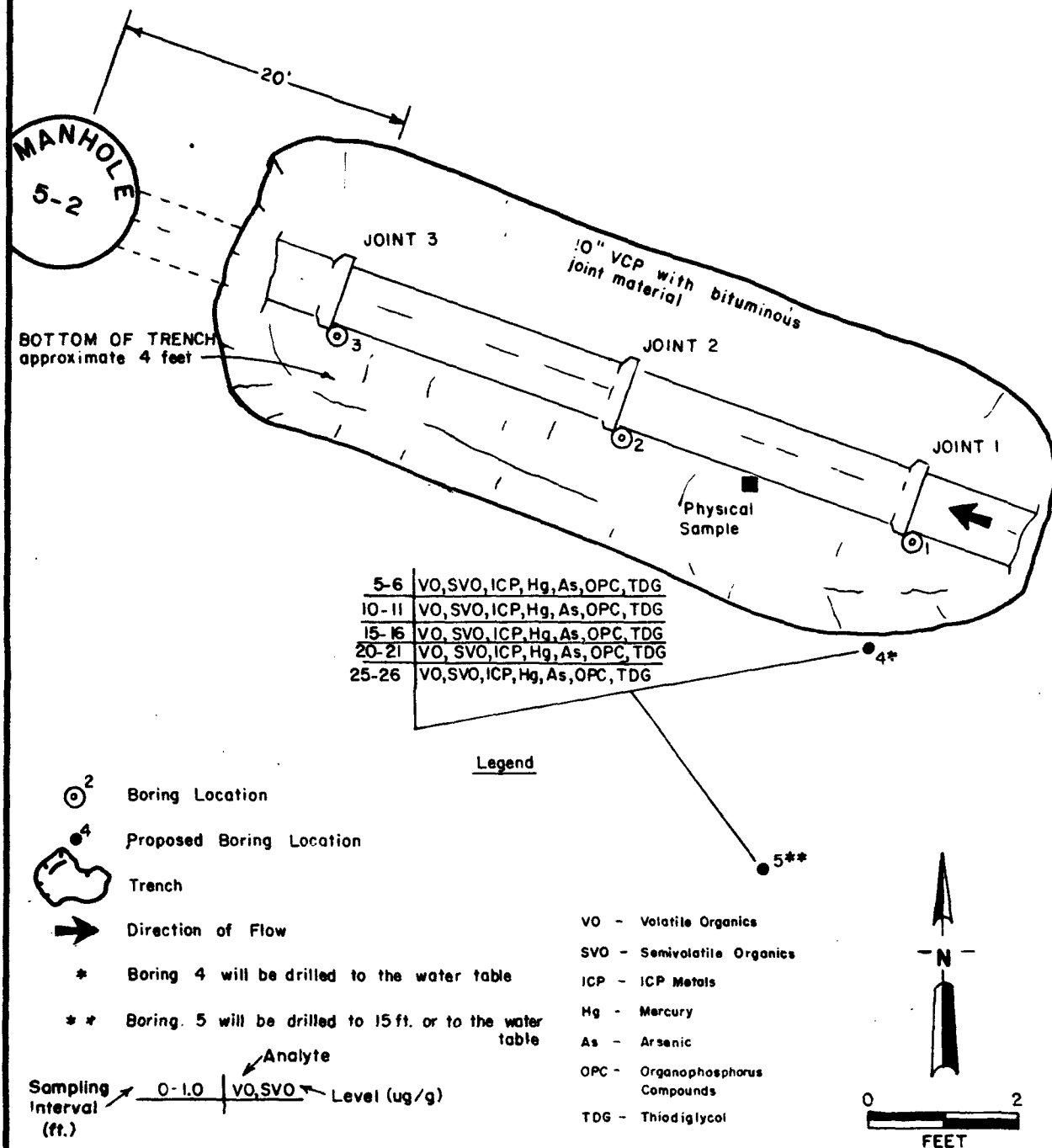
The additional work, if it occurs, will follow the methodology presented in the Task 10 Technical Plan (Ebasco, 1987a) and will consist of two sets of two borings at each of the Trenches MKE 11 and MKE 22 (Figures CS-NP-7a and 7b). Both borings will be drilled from the ground surface, one approximately 1 ft away from the pipe, the other 5 ft away. The first sample will be taken at a depth equal to the bottom of the pipe (approximately 5 to 6 ft) and additional samples will be taken at 5 ft intervals (10 to 11 ft, 15 to 16 ft, etc.). The boring 1 ft from the pipe will be drilled to the water table. The boring 5 ft away will be drilled to 15 ft beneath the pipe or to the water table, whichever is reached first. Groundwater maps indicate the water table is between 10 and 20 ft beneath the sewer at these locations.

It is anticipated that this program will yield 12 to 18 samples, depending on the depth to the water table.

<u>No. of Borings</u>	<u>Depth Below Sewer Invert (ft)</u>	<u>No. of Samples</u>
2	Water Table	3 to 5
2	15 ft or Water Table	3 to 4

The samples will be analyzed for semivolatile organics, ICP metals, mercury and arsenic to verify results of the initial investigation and to determine if the compounds detected have migrated away from the pipe. In addition, the samples will be analyzed for volatile organics and agent products (GBDP). As discussed previously, these were not included in the initial investigation, but may be needed to more precisely define the extent of contamination during the Feasibility Study or design phase of remediation. The maximum number of samples to be tested by each analytical method is listed below.

<u>Analytical Method</u>	<u>No. of Samples</u>
Volatile Organics (VO)	18
Semivolatile Organics (SVO)	18
ICP Metals	18
Mercury (Hg)	18
Arsenic (As)	18
Agent Products (GBDP)	18



Prepared for:

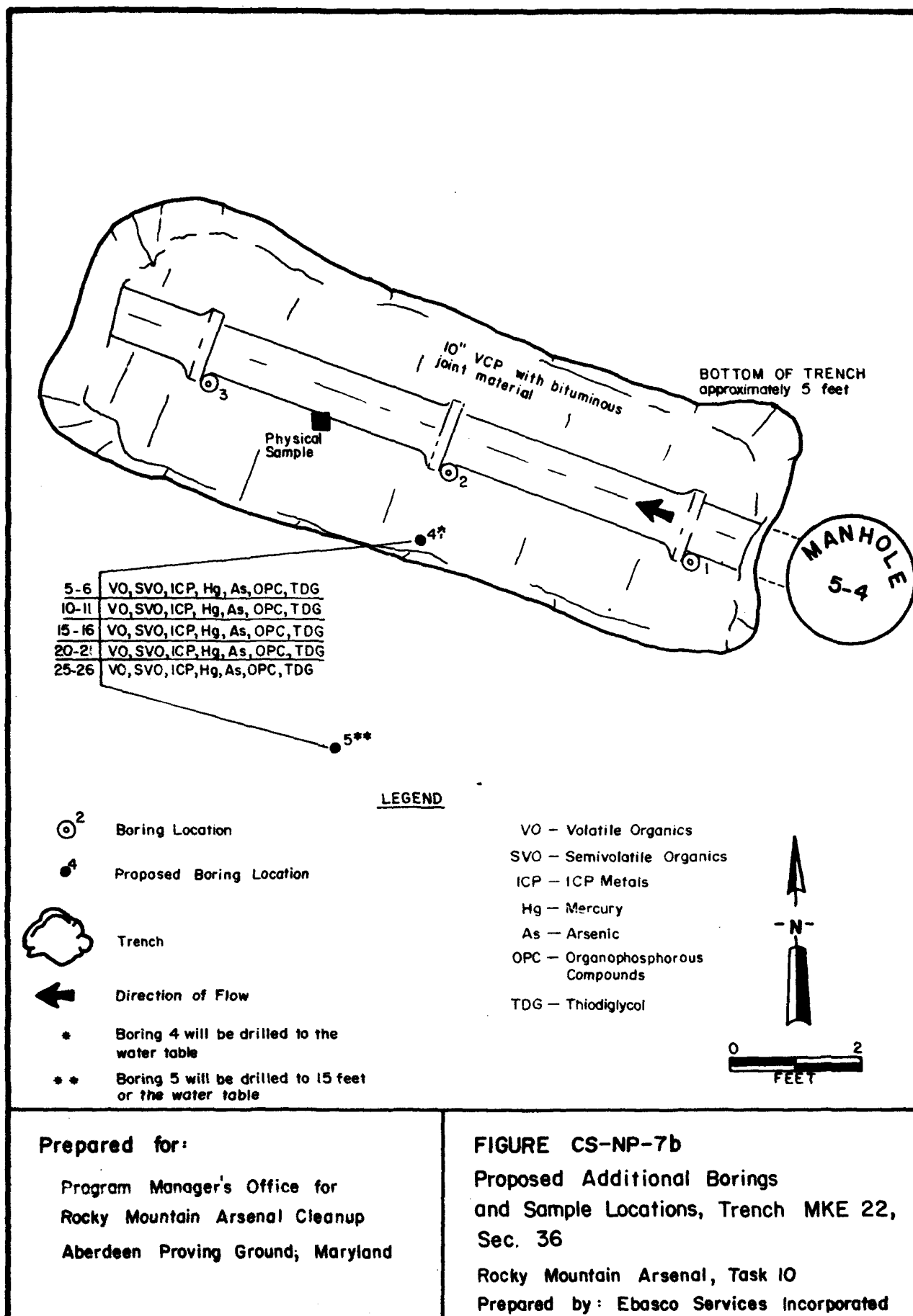
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 2/1/88

FIGURE CS-NP-7a

Proposed Additional Borings
and Sampling Locations, Trench MKE II,
Sec. 36

Rocky Mountain Arsenal, Task 10
Prepared by : Ebasco Services Incorporated



3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL

Based on the results of the field program, the estimated volume of potentially contaminated soil, rounded to two significant figures, is 140,000 cubic yards (yd^3) with an estimated uncontaminated overburden of 91,000 yd^3 .

Because samples were only collected from directly beneath the pipe, additional information is needed to determine the vertical and horizontal extent of potential contamination. No other data are available for the North Plants chemical sewer, so data from the South Plants chemical sewer has been used. The worst-case extent of potential contamination for the South Plants chemical sewer provides a conservative estimate of the extent of potential contamination from the North Plants chemical sewer. Based on data for Trench CS02 (Section 3.2, Chemical Sewers - South Plants, in this report), the soils were assumed to be contaminated to the water table and laterally to a distance of 10 ft on either side of the sewer line. The volume of potentially contaminated soil was determined by dividing the North Plants chemical sewer system into three sections and calculating soil volumes for each. The three sections are: the network of cast iron collection pipes upstream of the sump, Building 1727; the pressurized pipe between the sump and Manhole 5-4; and the VCP line between Manholes 5-4 and 5-1. The numbers given in the following table reflect this division. The pressurized pipe between the sump and Manhole 5-4 is actually two pipes, a 12 inch steel pipe and a 6 inch cast iron pipe. Because the actual distance between the two pipes is unknown, a spacing of 5 ft (60 inches) was assumed.

	<u>Collection Pipes</u>	<u>Pressurized Pipe</u>	<u>VCP</u>
Length of sewer line (ft)	4,800	4,100	2,000
Average pipe diameter (inches)	6	78	8
Average vertical extent of potentially contaminated soil beneath sewer line (ft)	15.6	15.7	13.9
Average depth of uncontaminated overburden (yd^3)	9.3	8	6
Lateral extent (ft)	20.5	26.5	20.7

	Collection <u>Pipes</u>	Pressurized <u>Pipe</u>	<u>VCP</u>
Estimated volume of potentially contaminated soil (yd ³)	57,000	63,000	21,000
Estimated volume of uncontaminated overburden (yd ³)	34,000	32,000	25,000

Total estimated volume of potentially contaminated soil = 140,000 yd³.

Results from this survey and the South Plants chemical sewer survey were used to generate a most conservative (worst-case) estimate of the volume of potentially contaminated soil associated with the North Plants chemical sewer. This delineation of the boundaries of potential contamination should not be construed to indicate the actual presence of contamination within the volumes outlined. In addition, this approach is not intended to imply that any or all of the soil within the potentially contaminated volume must be remediated, nor does it make any assumption about the type of remediation that may be required. Rather, this approach is intended to provide preliminary estimates of the maximum possible volume of contaminated materials for planning purposes only.

4.0 REFERENCES CITED

Barbieri, G.L. 1987, Personal communication.

COE (Corps of Engineers) 1957, July 12. Basic information map; contaminated and waste uses, GB plants area. Drawing No. 18-02-01. Revised September 15, 1961.

COE. 1984, June 1. Basic information maps; master plan of Rocky Mountain Arsenal. Drawing No. 18-02-01.

DeCet, L. 1987, Personal communication.

DOA (Department of the Army). 1971, March 9. Industrial waste line replacement, 1501 and 1503 sump to Building 1727. Rocky Mountain Arsenal, Colorado. Drawing No. E5-71-407.

The Earth Technology Corporation. 1987, June 10. Letter to Dale Gabel: draft report, laboratory geotechnical testing of contaminated material. Contract No. EN 77059. ETC Proposal No. 87-215-35.

RIC 87336R01

Ebasco, 1987a, November. Final technical plan, Phase I survey of North Plants. Task no. 42. Prepared for U.S. Army Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

RIC 87336R30

Ebasco. 1987b, November. Final technical plan, task no. 10, sewers and process water system investigations. Contract no. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Ebasco. 1988a, May. Rocky Mountain Arsenal Chemical Index. Prepared for Program Managers Office for Rocky Mountain Arsenal Cleanup.

Ebasco. 1988b, September. Contamination assessment report, Phase I survey of North Plants. Task no. 42. Version 3.2. Contract no. DAAK11-84-D-0017. Prepared for U.S. Army Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

ESE (Environmental Science and Engineering, Inc.). 1986a. Introduction to the contamination assessment reports, RMA. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination cleanup.

RIC 86317R01

ESE. 1986b. Water quantity/quality survey. Task 4, draft final screening program report, V. I, II and III. Prepared for Program Manager's Office, Rocky Mountain Arsenal Contamination Cleanup.

ESE. 1986c, May. Draft final source reports, 36-UNC, 36-3, and 36-A, Task 1. Prepared for Program Manager's Office, Rocky Mountain Arsenal Contamination Cleanup.

Heim, D. 1985, December 17. JURIS deposition, v. 3. JURIS computer database.

HRO (Holme, Roberts & Owen). 1987, December 2. Letter to Don Campbell: United States vs. Shell Oil. Transmittal of MKE sewers investigation data.

Mack, D. 1985, October 7. JURIS deposition, V. I. JURIS Computer database.

RIC 82295R01

May, J.H. 1982. Regional groundwater study of Rocky Mountain Arsenal, Denver, Colorado, report 1, hydrogeologic definition, technical report GL-82-6. Vicksburg, Mississippi: U.S. Army Engineers Waterways Experiment Station.

Parsons, Ralph M. & Company. 1955, September 29. Final report, disposal of chemical wastes, Rocky Mountain Arsenal. Contract No. DA-25-066-eng-3452. Prepared for Department of the Army.

RIC 81320R05

RMA. 1975, May 30. Off-post contamination control plan.

RIC 81339R21

RMA. 1976. Contaminated waste system report Rocky Mountain Arsenal.

RIC 84034R01

RMACCPMT. 1984, January. Decontamination assessment of land and facilities at Rocky Mountain Arsenal. Draft final report and executive summary, Appendix C.

USAEHA (U.S. Army Environmental Hygiene Agency). 1965, February. Report of industrial waste survey, project no. 3471E19-59/66. Rocky Mountain Arsenal Denver, Colorado. 9-21 February 1965. Microfilm RAA016, Frames 1870-1919.

USAEHL (U.S. Army Environmental Health Laboratory). 1960, June. Preliminary report sanitary engineering project no. 3471E19-60/61 industrial waste study Rocky Mountain Arsenal, Colorado. 3 June - 22 June, 1960. Microfilm RNA006, Frames 345-387.

USATHAMA. 1976-1986. Computer printout of groundwater data.

RIC 81266R54

USDA (U.S. Department of Agriculture, Soil Conservation Service). 1974, October. Soil survey of Adams County, Colorado.

Vitro (Vitro Corporation). 1951, June 22. Incendiary oil plant, building 727, contaminated drain sump piping. General arrangement plan and sections. Drawing no. 3705181, sheets 10 and 11. As built information added January 21, 1953.

Watson. G. 1974, January 10. Recommended change in the environmental impact statement for M34 cluster demilitarization. Microfilm RMA071, Frames 1334-1351.

Way, D.L. 1985, July. JURIS deposition, v. II, pp. 391-393; v. II, pp. 455-461; v. V, pp. 788-798.

Microfilm References

- MF RIA037 F 0209-0210. Unknown date. Program schedule for F 483.
- MF RMA003 F 1330. 11 October 1974. Memorandum regarding monthly summary report on demilitarization.
- MF RMA028 F 0502. March 1979. Particulate emission and afterburner tests for the disposal of CAIS in Building 1611.
- MF RMA030 F 0793. 31 March, 1983. Information on projected chemical workload.
- MF RMA034 F 0720. December, 1982. Disposal of chemical agent identification sets at RMA.
- MF RMA062 F 2141-2142. 4 June, 1976. Memo to Chief Safety Officer from Thomas M. Deputy. Mercury contamination.
- MF RMA067 F 0636. 13 October, 1966. Information regarding standing and operating procedures for production, demilitarization, and recovery of Shell 4.2 inch (CG) w/o burster.
- MF RMA100 F 0485, 0488, and 0542. January 1978. Final Report, Project Eagle Phase II, demilitarization and disposal of the M-84 cluster at RMA.
- MF RMA 106 F 2292-2297. 1 April, 1972. Memorandum for recording regarding destruction of GB agent.
- MF RMA116 F 0810. August 1983. Information regarding the disposal of chemical agent identification set at RMA.
- MF RMA117 F 1298. 5 July, 1984. Letter from C.H. Decker, RMA to R. Duprey, EPA.
- MF RMA153 F 1935. 14 February, 1984. DM demilitarization fact sheet.
- MF RSA001 F 1944-1945. Summary history of RMA, 1942 through 1967.
- MF RSA015 F 1959, 1975-1977. July 1965 to December 1965 and January 1966 to July 1966. Semi-annual historical report of RMA.

LITIGATION TECHNICAL SUPPORT AND SERVICES

ROCKY MOUNTAIN ARSENAL

**FINAL
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWER - SOUTH PLANTS
VERSION 3.2**

**September 1988
Contract No. DAAK11-84-D-0017
TASK NO. 10**

Prepared by:

**EBASCO SERVICES INCORPORATED
R.L. STOLLAR AND ASSOCIATES
CALIFORNIA ANALYTICAL LABORATORIES, INC.
DATACHEM, INC. GERAGHTY & MILLER, INC.**

Prepared for:

**U.S. ARMY PROGRAM MANAGER'S OFFICE FOR
ROCKY MOUNTAIN ARSENAL CONTAMINATION CLEANUP**

**THE INFORMATION AND CONCLUSIONS PRESENTED IN THIS REPORT REPRESENT THE
OFFICIAL POSITION OF THE DEPARTMENT OF THE ARMY UNLESS EXPRESSLY MODIFIED BY A
SUBSEQUENT DOCUMENT. THIS REPORT CONSTITUTES THE RELEVANT PORTION OF THE
ADMINISTRATIVE RECORD FOR THIS CERCLA OPERABLE UNIT.**

**THE USE OF TRADE NAMES IN THIS REPORT DOES NOT CONSTITUTE AN OFFICIAL
ENDORSEMENT OR APPROVAL OF THE USE OF SUCH COMMERCIAL PRODUCTS. THE REPORT
MAY NOT BE CITED FOR PURPOSES OF ADVERTISEMENT.**

TABLE OF CONTENTS

<u>Section</u>	<u>Page</u>
<u>EXECUTIVE SUMMARY</u>	
1.0 <u>PHYSICAL SETTING</u>	1
1.1 <u>LOCATION AND DESCRIPTION</u>	1
1.2 <u>GEOLOGY</u>	3
1.3 <u>HYDROLOGY</u>	9
2.0 <u>HISTORY</u>	13
3.0 <u>FIELD INVESTIGATION</u>	21
3.1 <u>PREVIOUS INVESTIGATIONS</u>	21
3.2 <u>FIELD SURVEY</u>	43
3.2.1 <u>Field Program</u>	43
3.2.2 <u>Field Observations</u>	48
3.2.3 <u>Geophysical Exploration</u>	52
3.2.4 <u>Analyte Levels and Distribution</u>	52
3.2.5 <u>Contamination Assessment</u>	154
3.3 <u>FOLLOW-ON INVESTIGATIONS</u>	167
3.4 <u>QUANTITY OF POTENTIALLY CONTAMINATED SOIL</u>	168
4.0 <u>REFERENCES CITED</u>	171

LIST OF FIGURES

Figure	Page
CS-SP-1 Location Map of the South Plants Chemical Sewer System	2
CS-SP-2 Typical Manhole Configuration	4
CS-SP-3a Field Boring Profile for Boring W21	10
CS-SP-3b Field Boring Profile for Boring 6, Trench CS03	11
CS-SP-4 Sampling Grid Used by MKE	24
CS-SP-5a Grain Size Distribution Curve Boring 12, 3.6-4.0 ft, Trench CS01, Section 1	79
CS-SP-5b Grain Size Distribution Curve Boring 12, 4.0-5.0 ft, Trench CS01, Section 1	80
CS-SP-5c Grain Size Distribution Curve Boring 9, 7.2-7.8 ft, Trench CS02, Section 1	81
CS-SP-5d Grain Size Distribution Curve Boring 9, 7.8-8.8 ft, Trench CS02, Section 1	82
CS-SP-5e Grain Size Distribution Curve Boring 9, 11.2-11.8 ft, Trench CS03, Section 2	83
CS-SP-5f Grain Size Distribution Curve Boring 10, 11.8-12.3 ft, Trench CS03, Section 2	84
CS-SP-5g Grain Size Distribution Curve Boring 11, 10.8-11.5 ft, Trench CS03, Section 2	85
CS-SP-5h Grain Size Distribution Curve Boring 12, 11.5-12.5 ft, Trench CS03, Section 2	86
CS-SP-5i Grain Size Distribution Curve Physical Sample, 5.3-6.1 ft, Trench MKE 2, Section 1	87
CS-SP-5j Grain Size Distribution Curve Physical Sample, 8.5-9.3 ft, Trench MKE 3, Section 1	88
CS-SP-5k Grain Size Distribution Curve Physical Sample, 7.0-8.0 ft, Trench MKE 4, Section 1	89
CS-SP-5l Grain Size Distribution Curve Physical Sample, 7.5-8.5 ft, Trench MKE 6, Section 1	90
CS-SP-5m Grain Size Distribution Curve Physical Sample, 5.5-6.3 ft, Trench MKE 7, Section 35	91
CS-SP-5n Grain Size Distribution Curve Physical Sample, 3.4-4.2 ft, Trench MKE 19, Section 1	92
CS-SP-5o Grain Size Distribution Curve Physical Sample, 3.9-4.5 ft, Trench MKE 20, Section 1	93

LIST OF FIGURES
(Continued)

Figure	Page
CS-SP-5p Grain Size Distribution Curve Physical Sample, 7.5-8.3 ft, Trench MKE 21, Section 2	94
CS-SP-6a Analytes Detected Within or Above Indicator Levels for Manholes W21, W25, W27, 4-3 and 6-1, Sections 1 and 2	95
CS-SP-6b Analytes Detected Within or Above Indicator Levels Dye/Excavation Study, Trench CS01, Section 1	96
CS-SP-6c Analytes Detected Within or Above Indicator Levels Dye/Excavation Study, Trench CS02, Section 1	97
CS-SP-6d Analytes Detected Within or Above Indicator Levels Dye/Excavation Study, Trench CS03, Section 2	98
CS-SP-6e Analytes Detected Within or Above Indicator Levels Trench MKE 2, Section 1	99
CS-SP-6f Analytes Detected Within or Above Indicator Levels Trench MKE 3, Section 1	100
CS-SP-6g Analytes Detected Within or Above Indicator Levels Trench MKE 4, Section 1	101
CS-SP-6h Analytes Detected Within or Above Indicator Levels Trench MKE 6, Section 1	102
CS-SP-6i Analytes Detected Within or Above Indicator Levels Trench MKE 7, Section 35	103
CS-SP-6j Analytes Detected Within or Above Indicator Levels Trench MKE 19, Section 1	104
CS-SP-6k Analytes Detected Within or Above Indicator Levels Trench MKE 20, Section 1	105
CS-SP-6l Analytes Detected Within or Above Indicator Levels Trench MKE 21, Section 2	106

LIST OF PLATES

Plate

- CS-SP-1 Vicinity Map Showing Sample Locations
- CS-SP-2 Topography and Surface Drainage
- CS-SP-3 Water Table Elevations and Generalized Groundwater Flow

LIST OF TABLES

Table	Page
CS-SP-1 Buildings Connected to the Chemical Sewer in South Plants . . .	5
CS-SP-2 Summary of Geologic and Hydrologic Data	8
CS-SP-3 Results of MKE Sewer Investigation: Chemical Sewer - South Plants	25
CS-SP-4 Tentative Identification of Nontarget Compounds - MKE Data. . .	29
CS-SP-5 Results of MKE Samples from Ebasco Sampling Locations	40
CS-SP-6 Manhole Reconnaissance Survey Observations	44
CS-SP-7 Borings, Depths, and Samples.	49
CS-SP-8 Summary of Analytical Results for Chemical Sewer - South Plants	53
CS-SP-9 Results of Field Study	54
CS-SP-10 Summary of Soil Properties, Indexes and Harvard Miniature Compaction Test	78
CS-SP-11 Tentative Identification of Nontarget Compounds	108

EXECUTIVE SUMMARY
CHEMICAL SEWER - SOUTH PLANTS

The South Plants chemical sewer system is located in the South Plants manufacturing complex in Sections 1 and 2 on the Rocky Mountain Arsenal. The system carried chemical wastewaters from production units in the South Plants manufacturing complex to disposal sites on the Rocky Mountain Arsenal. The chemical sewer is constructed primarily of 4 to 12 inch diameter vitrified clay pipe. The system was investigated under Task 10 during the winter of 1986-1987. A total of 68 borings, yielding 103 samples, were completed in 11 trenches and in 5 manholes.

Thirty-seven target analytes and a large number of tentatively identified nontarget compounds were detected in samples taken from along the chemical sewer including pesticides, herbicides, process intermediates, solvents, and metals. Aldrin and dibromochloropropane were detected in several samples at concentrations greater than 10,000 micrograms per gram, and a nontarget halogenated hydrocarbon was tentatively identified at 2,000 micrograms per gram. A general trend in several of the trenches and manholes was that the number and concentration of contaminants decreased with distance from the pipe.

No follow-on work is recommended for the South Plants chemical sewer system at this time. Based on the field program, the total estimated volume of potentially contaminated soil is 120,000 cubic yards, with an estimated uncontaminated (by the sewer system) overburden of 120,000 cubic yards.

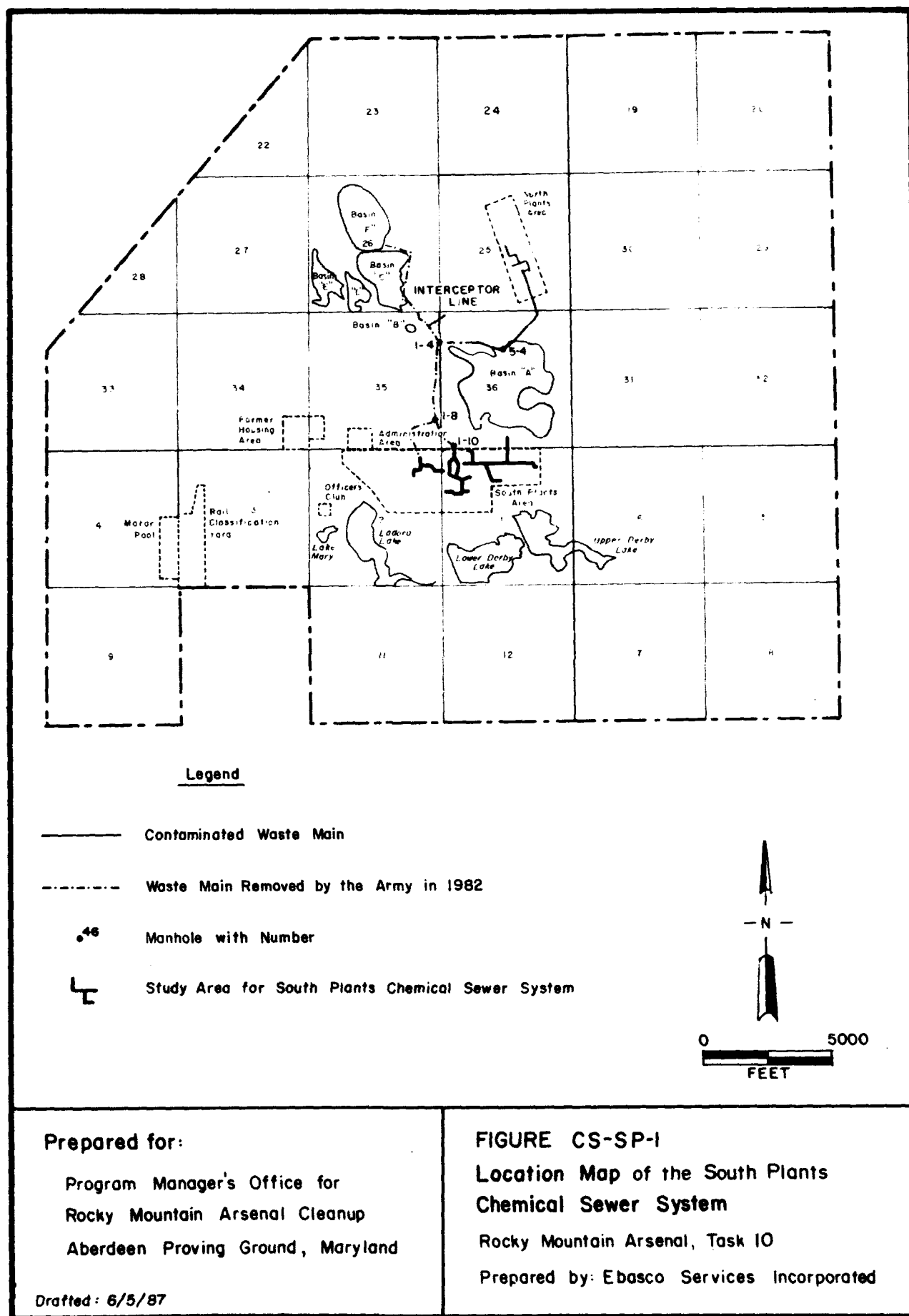
CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWER - SOUTH PLANTS

1.0 PHYSICAL SETTING

1.1 LOCATION AND DESCRIPTION

The South Plants chemical sewer system is located in the South Plants manufacturing complex in Sections 1 and 2 on the Rocky Mountain Arsenal (RMA). The South Plants chemical sewer system received wastes from various generators including the U.S. Army, Julius Hyman and Company, Colorado Fuel and Iron Company, and Shell Chemical Company.

The majority of the South Plants chemical sewer system was a gravity system constructed of 4 to 12 inch diameter vitrified clay pipe (VCP). The chemical waste stream was initially routed to Basin A and three lime slurry settling basins located in Section 36, and subsequently to Basin F located in Section 26. A general map that shows the location of the South Plants chemical sewer system is presented on Figure CS-SP-1. A detailed layout of the system is shown on Plate CS-SP-1. In the late 1970s, the Army stopped using most of the gravity system and constructed several steel force mains leading to a local waste treatment facility in the South Plants area. Wastes from the hydrazine blending facility continued to be routed to Basin F through the gravity system. At approximately the same time, Shell ceased using the underground gravity chemical sewer system and constructed an overhead collection system. In 1982, the Army removed approximately 15,000 feet (ft) of 8, 10, and 12 inch diameter vitrified clay pipe, which ran from the South Plants area to Basin F, from Sections 26, 35, and 36 (RMACCPMT, 1984/RIC 84034R01; Black & Veatch, 1981). The removed sections served the South Plants chemical sewer system, the North Plants chemical sewer system, and the combined flow from each area. The downstream ends of the South Plants chemical sewers were plugged at December 7th Avenue.



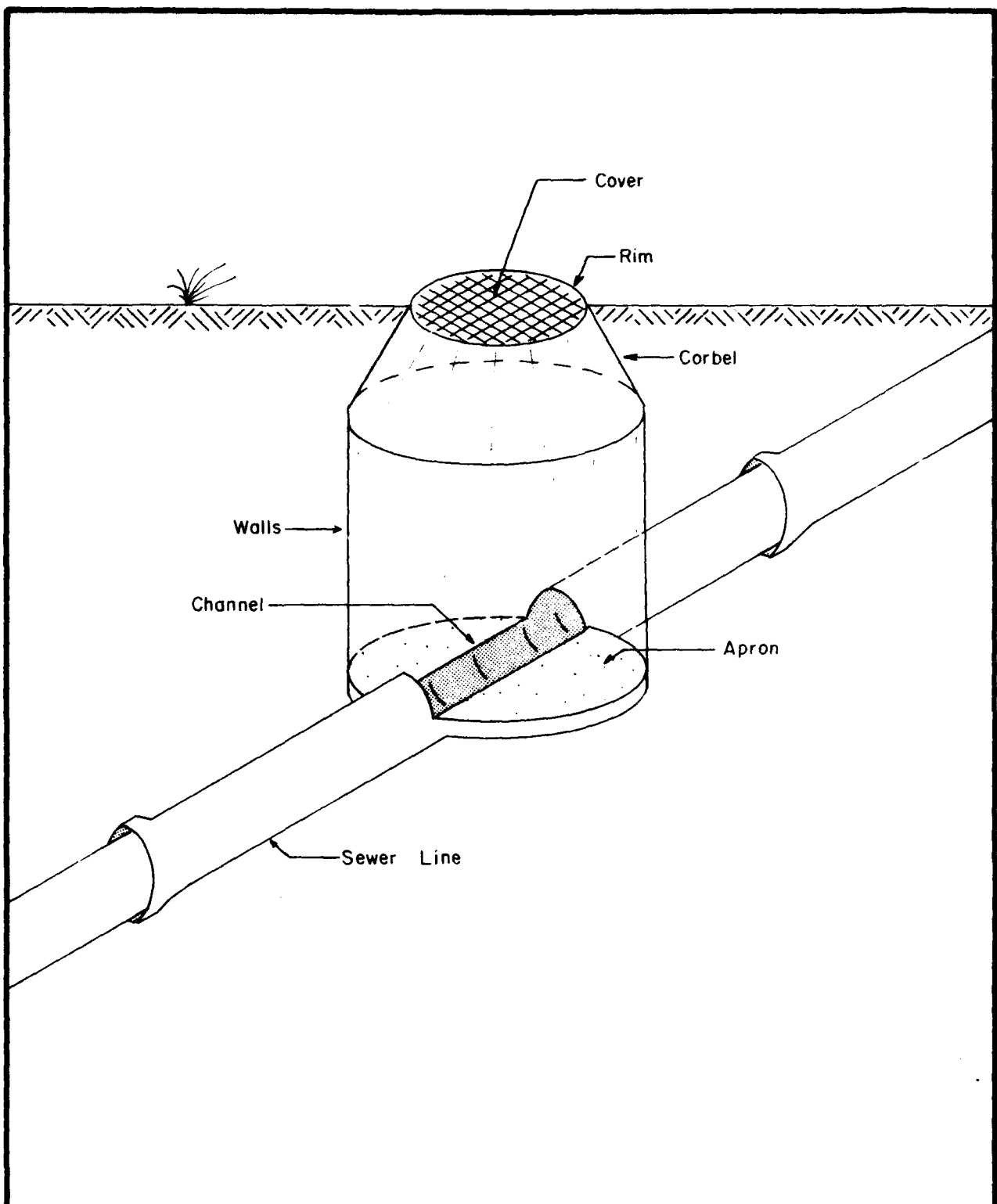
The South Plants chemical sewer system presently includes approximately 12,200 ft of vitrified clay pipe varying from 4 to 12 inches in diameter and 2,100 ft of steel force mains (COE, 1984). Manholes are primarily constructed of precast concrete or brick and mortar. The metal pipe joints are welded, and the vitrified clay pipe joints are sealed with oakum and cement (Green, 1987). Manhole materials and pipe joint materials were spot verified during field operations. A schematic of a typical manhole showing the rim, corbel, apron, channel, and walls is presented in Figure CS-SP-2. Buildings connected to the South Plants chemical sewer system are listed in Table CS-SP-1. These buildings are listed by building number, not by the order in which they were connected or disconnected.

1.2 GEOLOGY

The two uppermost stratigraphic units beneath the South Plants manufacturing complex are Quarternary alluvium and the Denver Formation (May, 1982/RIC 82295R01). This area is underlain by a relatively thin sequence of alluvium that covers a bedrock surface high (May, 1982/RIC 82295R01). The alluvium in the vicinity of the chemical sewer ranges from 3 ft (Well 01516) to 25 ft (Well 01505). Well locations are presented in Plate CS-SP-3 (Section 1.3).

The thinnest alluvium is present along the line south and west of Manhole W26 (Wells 01517, 01520, 01567, and 01007) and in the vicinity of Manhole W18 (Well 01516 and Trench CS01). The alluvial thickness increases to the north to greater than 20 ft (Wells 01505 and 01525) in the vicinity of the E-series manholes and to approximately 11 ft in the chlorine plant area (Well 02594 and Trench CS03). Alluvial thicknesses penetrated by borings in manholes and trenches during the Chemical Sewers - South Plants field program are shown in Table CS-SP-2.

The alluvium in the vicinity of the chemical sewer, as shown in logs from existing monitoring wells, is generally composed of combinations of silt and clay with lesser sand. A higher sand content is generally present in the



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

8/10/87

FIGURE CS-SP-2

Typical Manhole Configuration

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

TABLE CS-SP-1
BUILDINGS CONNECTED TO THE CHEMICAL SEWER IN
SOUTH PLANTS

Source: Ebasco, 1988b

Page 1 of 3

Building	Building Description and Use
242	Brine conversion to chlorine and dilute caustic
243	Major facility of chlorine plant
244	Chlorine storage
247	Brine storage tanks
249	Brine storage tanks
251	Until early 1960s: caustic evaporation for chlorine process; 1960s to 1980: empty; 1980-1982: storage of drummed wastes
313	1947-1951: offices and research lab
314	Laundry
331	Phosgene bomb filling; after 1977: PX storage, warehouse
411	Sulfur monochloride and dichloride manufacture, sulfur storage
412	Mustard manufacture, filling, and storage; dichloro manufacture
413	Steam recycle/condensate control building; white phosphorus storage.
422	Mustard manufacture, filling, and storage; aldrin filling and storage
424A	Control room building and lab for aldrin
424C	Aldrin filter building
432	Army warehouse; burned down in 1940s
451	Warehouse; drumming of liquid pesticides
471	Thionyl chloride, pesticide, and herbicide manufacture
473	Thionyl chloride drum loading; storage of nemagon, dibrom, DDVP, supona, and chlordane until 1982

TABLE CS-SP-1
BUILDINGS CONNECTED TO THE CHEMICAL SEWER IN
SOUTH PLANTS

Source: Ebasco, 1988b

Page 2 of 3

Building	Building Description and Use
502	West chemical sewer meter pit
503	East chemical sewer meter pit
506	Denver Effluent Treatment control house
509	Denver Effluent Treatment compressor/liquifier for methyl chloride
511	Manufacturing building; offices and lab
512	1942-1947: distilled mustard filling; pilot plant and holding tank for pesticides
514	Lewisite production 1942-1945; mustard distillation 1945-1947; chlordane and "Strauss Hex" manufacture 1947-1952; production of endrin, methylparathion, vaponal, cioldrin, bidrin, ethylparathion and azodrin 1951-1981
514A	Dowtherm Building, lewisite (M-1) crude storage, army boiler, burned in 1951, rebuilt
514C	Acid pumping station
514E	Monomethylamine dilution control
515	Chlorinated paraffin, bladex, endrin, and planavin
515A	1954-close: nudrin and endrin tank building.
516	1942-1947: lewisite; 1947-1951: chlordane; 1951-1973: endrin and dieldrin muriatic acid recovery
517	1942-1947: Army changehouse, tool room, office and lab
521	Lewisite production; cracking of dicyclopentadiene, production of thermal hex
521C	Lunchroom and field foreman office
525	Acetylene generation for lewisite process; process development lab; and nudrin manufacture
526	Pesticide filter building

TABLE CS-SP-1
BUILDINGS CONNECTED TO THE CHEMICAL SEWER IN
SOUTH PLANTS

Source: Ebasco, 1988b

Page 3 of 3

Building	Building Description and Use
528	1945-1946: mustard incineration; 1966-1982: pesticide refrigeration
529	1942-1951: pumphouse for lewisite and mustard distillation; tempered water system for azodrin
531	Warehouse
532	Warehouse, empty containers until 1971; 1971-1982: planavin, bladex, and atrozine packing
534B	Planavin unit process equipment
536	Storage of crude mustard, acid, and caustic; mustard demil
537	Thaw house for mustard purification; mustard demil
538	Drum disposal; mustard demil
540	Decon building, to renovate mustard containers; evaporation of brine
556	Vertical holding tank
561	Bicycloheptadiene process unit; building gutted in 1981
571	Waste vent gas incinerator
571B	Heavy and light organics tank room; hex bottom storage
724	Denver Effluent Treatment salt handling and incineration
727	Electric, auto, and carpentry shop
729	Storehouse, maintenance shop, changehouse, and office
732	Napalm production, M-19 manufacture
741	Refrigeration building
742	Incendiary oil bomb and mustard filling, warehouse, and pesticide control shop
742A	Tankhouse for distilled mustard
743	Laboratory, change house, office

Table CS-SP-2. Summary of Geologic and Hydrologic Data. Page 1 of 1.

Sampling Location	Surface Elevation* (msl)	Denver Surface Elevation* (msl)	Depth to Groundwater* (ft)	Groundwater Elevation* (msl)	Invert Depth (ft)	Invert Elevation (msl)
W21	5271	GT 5263	23	5248	7.4	5263.1
W25	5271	GT 5264	24	5247	6.4	5264.3
W27	5272	GT 5265	23	5249	6.5	5265.6
4-3	5273	5252	28	5245	7.9	5265.4
6-1	5272	5254	26	5246	8.6	5263.6
CS01	5267	GT 5263	10	5257	4.0	5263
CS02	5272	GT 5264	10	5262	7.8	5264
CS03	5275	5263	22	5253	11.5	5263

LT - Less than

GT - Greater than; sewer invert is below Denver Formation surface

* - Values are rounded to the nearest foot

Note: Water levels were measured during drilling. The recorded depths are therefore dependent on field conditions and the amount of time the boreholes were allowed to stand before the water levels were measured.

009IU/0185A

Rev. 2/25/88

northern portion of the South Plants area and in the chlorine plant area. Alluvial thickness and composition may vary in the South Plants area due to manmade disturbances, excavations, and the presence of fill associated with the construction of buildings, roads, and railroads.

The underlying Denver Formation bedrock is composed of interbedded claystone and sandstone, with lesser lignite. As borings drilled in the South Plants area do not penetrate the Denver Formation completely, the total thickness of the formation in this area is unknown. A detailed description of the Denver Formation is found in a study by May (1982/RIC 82295R01).

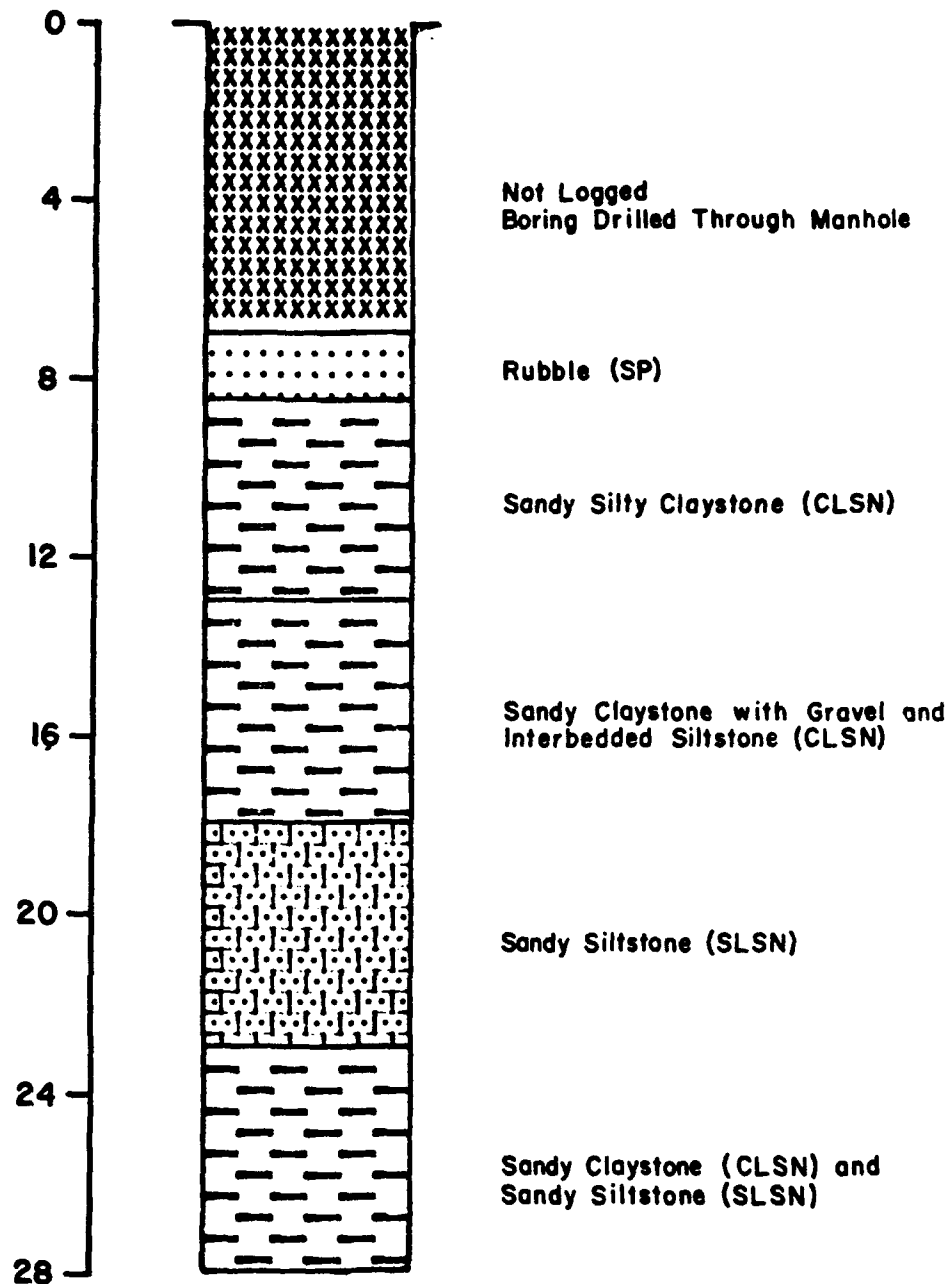
Profiles for the boring drilled through Manhole W21 and Boring 6 in Trench CS03 are shown in Figures CS-SP-3a and b.

1.3 HYDROLOGY

The South Plants manufacturing complex is located on a nearly flat-lying topographic high at an elevation of approximately 5,270 ft above mean sea level (msl). Surface water is primarily controlled by man-made ditches, which generally carry water in four directions (Plate CS-SP-2). Most of the runoff from the South Plants complex in Section 2 and the southwestern portion of the South Plants area in Section 1 flows west and southwest to the Sand Creek Lateral. Water from the northern part of South Plants in Section 1 flows both east and north. Runoff from the southeastern portion of the area flows southeast toward the Derby Lakes.

Surface water quality data from December 1985 are available for several locations in the South Plants area (Plate CS-SP-2). Water draining north into Section 36 contained detectable levels of dicyclopentadiene, methylisobutyl ketone, dibromochloropropane, diisopropylmethyl phosphonate, p-chlorophenylmethyl sulfide, p-chlorophenylmethyl sulfoxide, p-chlorophenylmethyl sulfone, benzene, toluene, ethylbenzene, xylene, chloroform, 1,1-dichloroethane, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, tetrachloroethylene, and chlorobenzene (ESE, 1986a/RIC 86317R01). Runoff sampled at the western edge of the complex contained

FEET



All Units are in the Denver Formation.

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

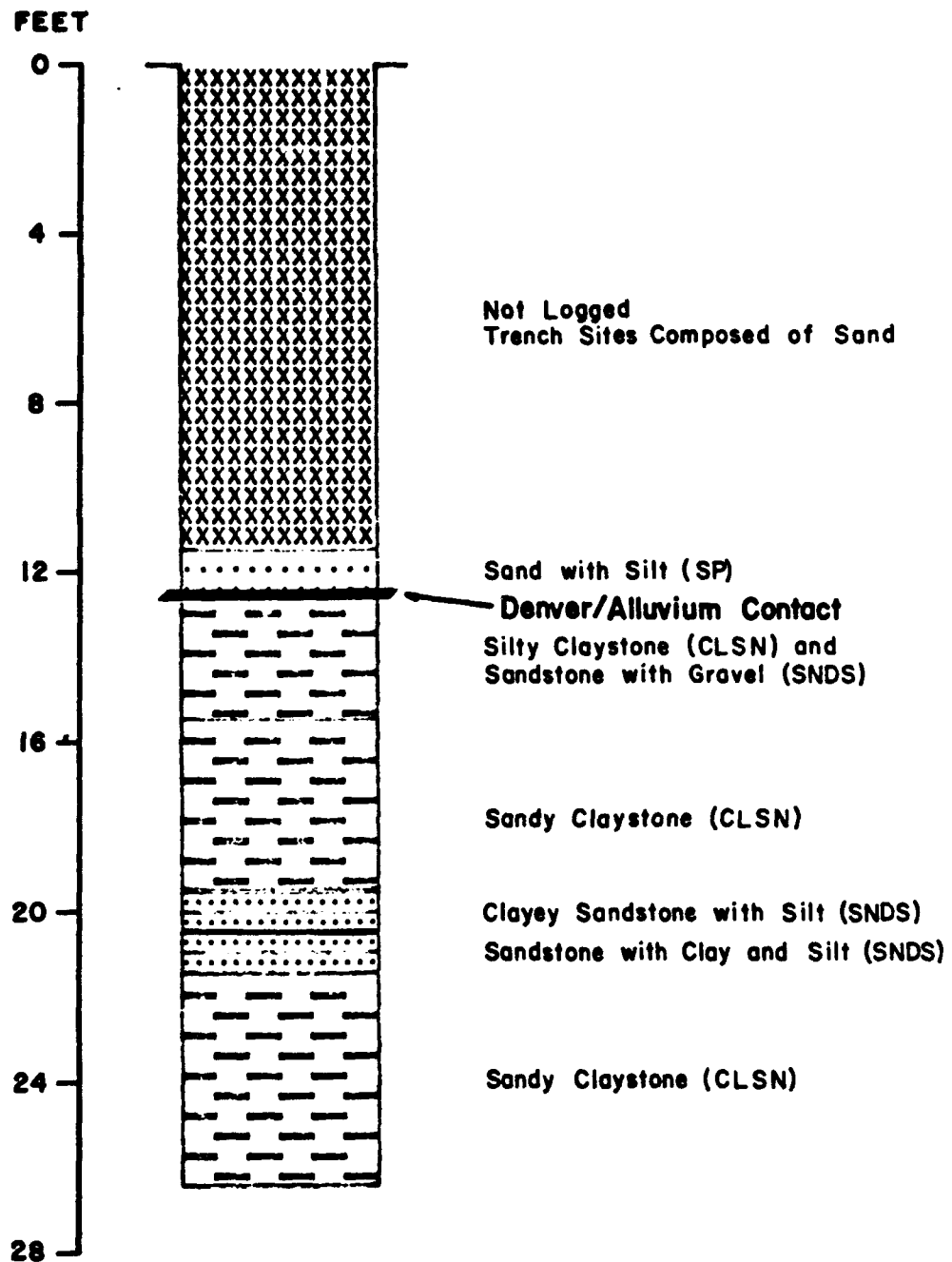
Drafted: 2/2/88

FIGURE CS-SP-3a

Field Boring Profile for Boring W21

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 2/1/88

FIGURE CS-SP-3b

**Field Boring Profile for Boring 6,
Trench CS03**

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

aldrin, isodrin, dieldrin, endrin, chloroform, benzene, and methylisobutyl ketone; and surface water draining toward Lower Derby Lake, sampled at the southeastern corner of South Plants, contained isodrin, dieldrin, chloroform, benzene, and methylisobutyl ketone (Spaine & Gregg, 1983/RIC 83228R01).

The primary direction of alluvial groundwater flow across RMA is to the northwest; however, a localized groundwater mound diverts flow radially from the South Plants area (Plate CS-SP-3). A previous investigation attributed the presence of the groundwater mound to water leaking from underground pipes into low permeability material (Stollar & Van der Leeden, 1981/RIC 81293R05). However, the presence of the bedrock high of less permeable material in the South Plants area may have contributed naturally to the groundwater mound. The groundwater elevation in the area of the chemical sewer in South Plants as measured in the summer of 1986, ranged from 5,260.9 ft msl in Well 01568, located in the center of the mound, to 5,247.6 ft msl in Well 01008 at the eastern edge of South Plants. Depth to groundwater in these wells was 9.2 and 12.6 ft, respectively (ESE, 1987a). Depth to groundwater observed during the field program is shown in Table CS-SP-2.

A comparison of the groundwater elevations (Plate CS-SP-3) and sewer line elevations (MKE, 1986) indicates that the northern section of the system is at the same elevations as, or below, the current local groundwater level. The area includes Manholes W1, W2, W3, W8, W12, and the E-series manholes north of Manhole E7, excluding E12 and E13.

Groundwater quality data from December 1985 and January 1986 are available for the area of the chemical sewer in South Plants. Chemical distribution maps for alluvial wells generated by ESE under Task 4 have shown that the following chemicals have been detected in alluvial wells in the vicinity of the South Plants chemical sewer line: dieldrin, p-chlorophenylmethyl sulfoxide, p-chlorophenylmethyl sulfide, 1,4-dithiane, 1,4-oxathiane, 1,1-dichloroethane, 1,1-dichloroethylene, mercury, benzene, trichloroethylene, chloroform, chlorobenzene, trans-1,2-dichloroethylene, 1,1,1-trichloroethane, 1,1,2-trichloroethane, tetrachloroethylene, arsenic, dibromochloropropane, and diisopropylmethyl phosphonate (ESE, 1986a/RIC 86317R01).

Because these compounds are representative of the class of chemicals typically found in the groundwater beneath the South Plants manufacturing complex, their presence in the groundwater beneath South Plants does not by itself indicate that the sewer line is contributing to groundwater contamination.

2.0 HISTORY

Information on the history of the area defined as the South Plants chemical sewer was gathered through a search of the Shell I, Shell II, and Juris computer databases. No review of aerial photographs was conducted for the predominantly underground system.

The South Plants manufacturing complex was originally constructed by the Army in 1942 to house operations for the manufacture of military chemicals. In 1949, Julius Hyman and Company leased excess facilities for the production of insecticides (JHC, 1949). In May 1952, Shell Chemical Company (SCC) took over the Hyman leases (CWS, 1952). Shell manufactured herbicides, insecticides, and pesticides until 1982. During the 1950s, Colorado Fuel and Iron also leased facilities in the South Plants area and manufactured chlorobenzene, dichlorodiphenyltrichloroethane (DDT), naphthalene, and chlorine.

Currently, there are no production activities in South Plants. Shell Oil Company still holds leases on a few buildings in South Plants, and the Army operates and maintains a few buildings in South Plants such as the maintenance shops, laundry, firehouse, and laboratory.

Initially the Army built five separate sewer systems for disposal of wastewater generated in the South Plants complex: toxic waste, nontoxic contaminated waste, caustic waste, uncontaminated process wastewater, and sanitary sewage (CWS, 1945a; CWS, 1945b). The process wastewater and sanitary sewage system are addressed in separate contamination assessment reports. The toxic, nontoxic contaminated, and caustic systems have been integrated into one system over the years and are commonly referred to as the chemical sewer or the contaminated waste system. This report will refer to it as the chemical sewer system.

Changes and additions that were made to the chemical sewer system to accommodate changes in plant operations are outlined below. Refer to Plate CS-SP-1 for the location and number of manholes. Manhole numbers appear as designated by the Shell Chemical Company (MKE, 1986), with Army numbers given as appropriate in parentheses (e.g., W27 (14)).

<u>Date</u>	<u>Changes and Additions</u>
-------------	------------------------------

1942	
------	--

	The chemical sewer consists of the three separate waste systems: the toxic waste system, the nontoxic contaminated waste system, and the caustic waste system.
--	----------------------------------------------------------------------------------------------------------------------------------------------------------------

The toxic waste lines collected neutralized wastes from the mustard and lewisite production areas. Wastes from mustard production were collected in a 10 inch sewer which emptied into a 30 inch line running north under December 7th Avenue and then into Basin A. Wastes from lewisite manufacture flowed first to the M-1 pits and then to Basin A via the 30 inch line. Wastes from the acetylene plant were pumped to the lime settling basins in the southwest corner of Section 36 (RMA073 F 0432). The toxic waste lines received wastes from the original Army Manholes W12 (1), W15 (2), W16 (3), W21 (4), W22, W25 to W27 (10), W31 (11), and (14) to (17) (CWS, 1945a; 1945b; WR&SK, 1943; MKE, 1986).

The nontoxic waste system, west of "D" Street, originally served as both a conveyance for chemical waste and a storm sewer. The original manholes (designated by the "I" numbering series) in the chlorine plant area were covered with open grates. In addition, the nontoxic contaminated waste system received wastes associated with the phosgene bomb filling activities in Building 331 (MKE, 1986). Originally the nontoxic waste system discharged into the Sand Creek Lateral, which subsequently discharged into First Creek, but it was discovered that salt concentrations were too high for normal dilution by First Creek. The nontoxic

<u>Date</u>	<u>Changes and Additions</u>
1942	waste was diverted into two ponds in the southwestern corner
(cont.)	of Section 26, Basins D and E (CWS, 1945a; CWS, 1945b).

The caustic waste line was constructed to carry caustic from the chlorine plant area to a waste basin lined with soils selected from other areas of RMA and considered to be impermeable (noted as the "Dry Reservoir" on Plate CS-SP-1) in the southeastern corner of Section 35 (CWS, 1945a; CWS, 1945b). This sewer line and basin were never used for caustic as all the caustic produced was utilized by the caustic fusion plant (Donnelly, undated). This line included Manholes 1 through 6.

1951	Service to Building 742A was established by the installation of a force main from the building to a manhole south of Building 727 and by a gravity sewer from the unnumbered manhole to Manhole A, east of Building 538 (MKE, 1986).
------	--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

A chemical sewer drain under Building 742 was installed in conjunction with the installation of the distilled mustard filling line (Donnelly, 1951).

Wastes from Building 532A (the WP filling plant) were diverted from the chemical sewer to the storm sewer. Storm sewers in this area drained to the Sand Creek Lateral which emptied into Basin D (RMA060 F 1933).

1953	A chemical waste sewer line was constructed from Building 732 to Basin A. This line included Manholes A, B, and C (MKE, 1986). This line was never used for contaminated waste (Donnelly, 1960/RMA060, 1932).
------	---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Date

Changes and Additions

1953

(cont.)

Julius Hyman and Company installed a 12 inch sewer line, which tied into an existing line between Manholes (1B) and (1). Manholes H-1 and H-2 were constructed at this time (JHC, 1953). This line segregated Hyman waste flows from Army waste, and discharged them to a settling basin located at the southeastern corner of the lime settling basins (MKE, 1986).

Cement joints in part of the chemical sewer south and east of the old mustard manufacturing plant (Building 422) were eroded by very acidic wastes coming from Building 412. Wastes were temporarily diverted to an open ditch which flowed to Basin A or Basin D until the damaged pipe could be replaced (RLA002 F 0498; RIA001 F 0594-0595; RLA002 F 1514).

1956

Basin F and chemical sewer mains from the North and South Plants complexes were constructed (Craft, 1982; MKE, 1986). Manholes 4-1, 4-2, and 4-3 were constructed, which linked the chlorine plant contaminated waste system (Manholes I-1 to I-15, except I-10) to the original unused caustic waste line (Manhole 6). The caustic waste line was rerouted to the new chemical sewer at Manhole 1-8 in the southeast corner of Section 35 with the addition of Manholes 3-1 and 3-2 (MKE, 1986).

The chemical sewer main to Basin F, north of December 7th Avenue, was connected to Manholes 1-10 and 2-1 in Section 36.

1957

The Army constructed a 6 inch chemical sewer line and Manholes (21), (22), and (23) to carry waste flows from Buildings 313 and 314 to the main sewer line at Manhole W21 (4) south of Building 517 (DOA, 1957).

1965

Manholes W4A and W5 were installed along with associated pipe near Building 534A (Craft, 1982).

<u>Date</u>	<u>Changes and Additions</u>
1967	Floor drains from the Building 515 extension were installed (Craft, 1982).
1968	A sewer line from a vent gas burner (VGB) in Building 571 to Manhole E14 was installed; Manholes E13 and E14 and the sewer line to Manhole E12 were added at this time (Craft, 1982).
1970	A sewer connection was added from tank T-1337 to Manholes W6 and W5, near Building 534B (Craft, 1982; SCC, 1970a). The sewer line from the west side of Building 534B to north of 534 tank farm was replaced. Manhole W3 and was installed and the line from W4 to W2 was abandoned (Craft, 1982; SCC, 1970b).
1971	The contaminated sewer lines and manholes on the east side of Buildings 514 and 516 were replaced and rerouted, including installation of Manholes E5, E6, E7 and E8. The sump north of Building 528 was abandoned (Craft, 1982).
1972	Fifty feet of the 4 inch VCP north of Building 534B were replaced (SCC, 1972a; Craft, 1982).
1972-1973	A one-quarter inch stainless steel liner was installed inside the deteriorated sump (above grade) at the northern end of Building 516 (SCC, 1972b).
1973	The line north of December 7th Avenue was replaced, three manholes were installed, and overflow to Basin A was blocked (Craft, 1982).

<u>Date</u>	<u>Changes and Additions</u>
1974	<p>Building 514 was connected to Manhole 11A (not shown on Plate CS-SP-1) with 4 inch cement-lined cast iron pipe (CIP) (Craft, 1982; SCC, 1974a).</p> <p>Manhole E15 and the drain line to the flare tower were installed (Craft, 1982; SCC, 1974b).</p>
1975	<p>The sewer line from Building 516, extraction area, to the scrubbers southeast of Building 514 was replaced (SCC, 1975a; Craft, 1982).</p> <p>Manholes (18) and (19) and the sewer line south of Building 471 were replaced. New manholes were W32 and W33, respectively (Craft, 1982; SCC, 1975b).</p> <p>A drain from the hexane tank to Manhole W1 was installed (Craft, 1982).</p> <p>A sump east of Building 532, a sewer line, and Manholes W6A, W6B, and W6C were installed (Craft, 1982).</p> <p>Approximately 1,500 ft of pipe from Manhole 1A-1 (not shown on Plate CS-SP-1) to Basin F were replaced (SCC, 1975c).</p>
1976	<p>The sewer line from the bicycloheptadiene operating area west of Building 561 was installed, and the drain from the tank farm to Manhole E5B was connected (Craft, 1982; SCC, 1976a).</p> <p>A sump east of the Building 514A tank room was replaced with a new sump and new associated piping (SCC, 1976b; Craft, 1982).</p>

<u>Date</u>	<u>Changes and Additions</u>
1976 (cont.)	<p>The line from Manhole E7 to the east meter pit and Manholes E1, E2, E3, E4, E5, E6, and E7 was replaced (Craft, 1982).</p> <p>Drain lines from Buildings 727 and 729 to new sumps were installed to remove Shell flow from the sewer line used by the Army (Craft, 1982).</p> <p>The sewer and tank farm for the Denver Effluent Treatment system was installed near Buildings 508, 571, 571A, 571B, and 724 (Craft, 1982).</p> <p>Drains from the tank farm east of Building 534 were installed (Craft, 1982).</p> <p>A new concrete sewer line from Building 313 and 314 was constructed west across "D" Street to Manhole 6 where it connected to the original caustic line that discharged to Basin F. Manholes 6-1, 6-2, 6-3, and 6-4 were added in the chlorine plant area along the new line (MKE, 1986).</p>
1978	<p>A new flow metering system and Manholes E4A and E4B were installed southeast of Building 514D (Craft, 1982; SCC, 1978a).</p> <p>Three sewers were installed from the railroad loading area to the existing sewer line near Manhole E16 (Craft, 1982).</p> <p>A portion of line between Manholes E5 and E6 was repaired (Craft, 1982).</p> <p>Six metering stations in Manholes W12, W22 (2 meters), E7 (2 meters), and E11 were installed. Five inlets to Manholes W31 and W27 were plugged (Craft, 1982).</p>

<u>Date</u>	<u>Changes and Additions</u>
1978 (cont.)	<p>The sewer line from Manholes W15 and W14 to W9 was abandoned. A new 4 inch VCP line from Manhole W13 to the line running from the Building 514E sump to Manhole E5A was installed (Craft, 1982).</p> <p>A new line was installed connecting Manholes W1 and E2 and Manhole EW1 was installed, which connected the east and west branches of the chemical sewer in South Plants (Craft, 1982).</p>
1979	<p>A vent in the sewer line to the air wash in Building 471 was installed (SCC, 1979a).</p> <p>Sewer lines between the Shell facilities and Basin F were plugged (Craft, 1982).</p> <p>The sewer line from Manhole W32 to W31 was abandoned. Manhole W33 and the line from Building 473 to new Manhole W32 were replaced (SCC, 1979b).</p> <p>The sewer pipe from Manhole W33 to W32 was slip-lined. Two sump pumps were installed and discharge was piped overhead to the tie-in to the sewer north to Building 451 (Craft, 1982).</p> <p>The line from Manhole W3 to W4 was plugged (Craft, 1982).</p>
1980	<p>The portion of the existing contaminated sewer used by Shell was replaced with a new overhead chemical waste collection system (Craft, 1982; SCC, 1980).</p>
1982	<p>The chemical sewer main from South Plants to Basin F was removed north of December 7th Avenue, except for a small unused portion of the caustic waste line in Section 35 (Unauthored, 1980/MF RAA016, F 1337).</p>

The chemical sewer is believed to be a major source of groundwater contamination in the South Plants area (MKE, 1986). However, documentation of actual leaks is limited. During the 1950s, acid leaked from the chemical sewer in the vicinity of Building 412 (Meetze 1953; Vess, 1953). A portion of the chemical sewer line north of Building 516 leaked acetic acid, aldrin, caustic soda, dieldrin, endrin, and xylene. A significant sewer leak near Building 314, the laundry, is suspected, because tetrachloroethane, a laundry cleaning agent, was detected in nearby groundwater (SCC, 1979c). Other leaks have been reported to have occurred near Buildings 451 and 514 (SCC, 1979c).

3.0 FIELD INVESTIGATION

3.1 PREVIOUS INVESTIGATIONS

The regional soil type in the vicinity of South Plants is of the Ascalon-Vona-Truckton Association. This association consists of loamy and sandy soils formed in wind laid deposits on uplands that are somewhat excessively drained to well drained (Kolmer & Anderson, 1977/RIC 81295R07).

Soil contamination studies were conducted under Tasks 1 and 14 for the removed chemical sewer in Sections 26, 35, and 36 as Sites 26-9, 35-2, and 36-20, respectively (ESE, 1987a; ESE, 1987b). Additionally, Shell Chemical Company spills in the South Plants area were investigated under Task 2, Sites 1-13 and 2-18 (Ebasco, 1987a). Two soil investigations were continuing during the writing of this report: Task 24, Army Spills (Ebasco, 1988d), and the South Plants Regional Study (Ebasco, 1988e). These studies are primarily concerned with surface spills.

Over the years, investigations of the chemical sewer system have been made primarily to assess the need for repairs and improvements to the system. Studies were conducted by Parsons and Company in 1955, the U.S. Army Environmental Health Laboratory (USAEHL) in 1960, the U.S. Army Environmental Hygiene Agency (USAEHA) in 1965 and 1984, and Morrison-Knudsen Engineers (MKE) in 1986.

The Parsons study evaluated the volume of waste streams generated by different facilities on RMA. The study was initiated to identify the most economical way to reduce the possibility of groundwater contamination from chemical wastes (Parsons, 1955). At that time approximately 100 gpm of effluent was being discharged into Basin A by Shell Chemical Company in the South Plants area. The effluent was primarily cooling water from shell-and-tube condensers. This water was not circulated through the normal Derby Lake cooling system to ensure that any possible leakage in the condensers would not enter the lakes.

The 1960 report by the USAEHL evaluated the source, volume, and composition of the industrial wastes generated at RMA. At the time of the report, an average of 131 gallons per minute (gpm) were being discharged from the North and South Plants complexes to Basin F, the majority of which originated from the Shell complex. Analyses of the wastewaters indicated a large variance in composition and strength, which was attributed to the batch process nature of the SCC manufacturing methods (USAEHL, 1960).

A similar study was completed by the USAEHA in 1965. During the period February 8 - 21, 1965, the total waste flow into Basin F averaged 267 gpm, 10.5 coming from Army activities (including 3 gpm from North Plants) and the remainder coming from SCC activities (USAEHA, 1965). The flow rate was just over twice that found in the 1960 study. Chemical analyses showed the waste stream was only about one quarter as concentrated as in the 1960 study.

The USAEHA issued a report in 1984 concerning the general condition, problems, and recommendations for the chemical and sanitary collection and treatment systems at RMA. At the time of the study, the only industrial wastes discharged to the chemical sewer were laboratory wastes from Buildings 313 and 743 and the pesticide shop in Building 742. These wastes were collected and transported through force mains to the Building 556 holding tank and then transported to Building 540, where they were treated and discharged to the sanitary sewer. No recommendations were made regarding the condition or use of the chemical sewer or treatment system (USAEHA, 1984/RIC 86213R02).

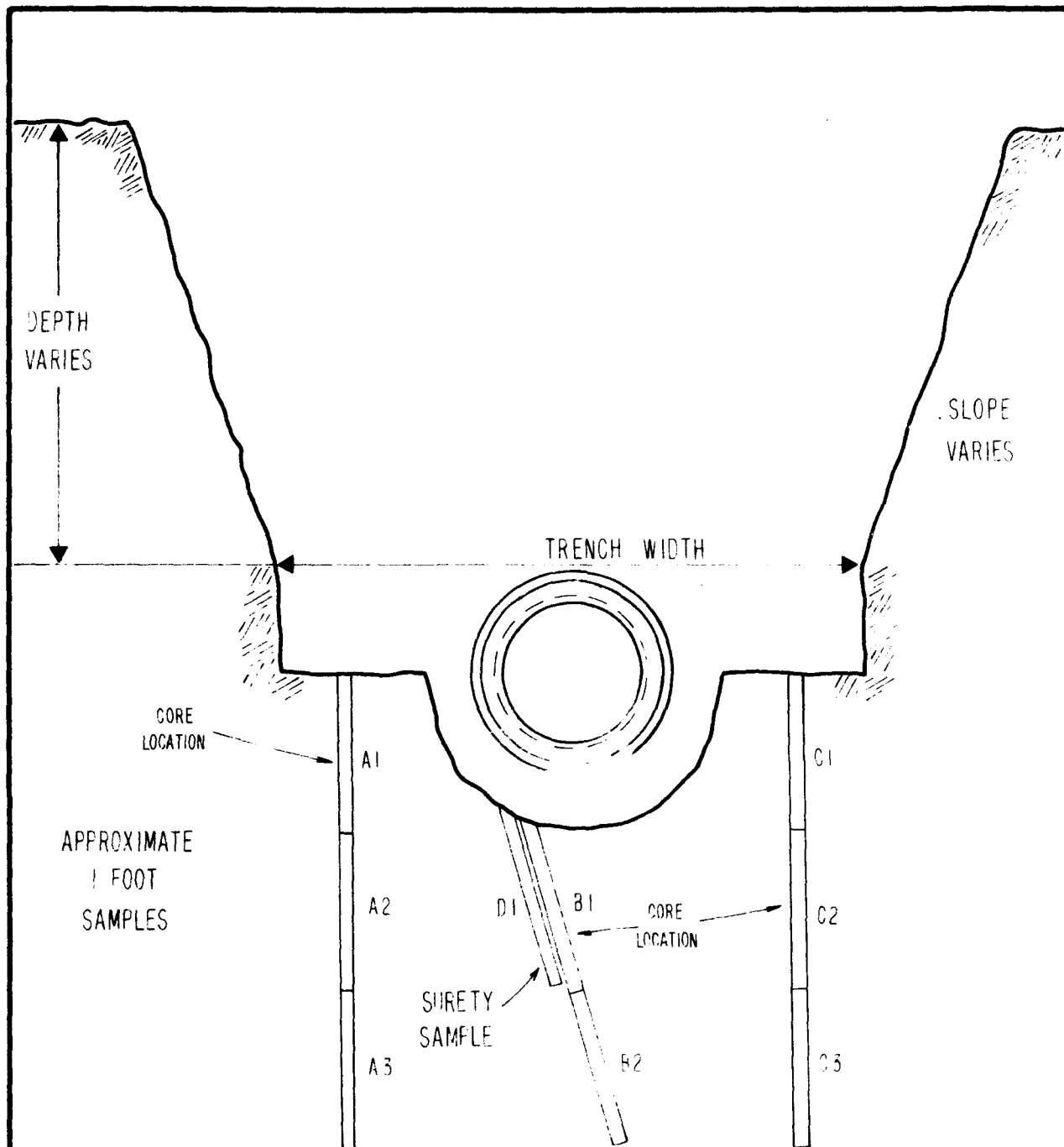
Under Phase I of the RMA sewer investigations, Morrison-Knudsen Engineers surveyed the physical configuration of the chemical and sanitary sewers located within the Shell Chemical Company's leasehold in South Plants (MKE, 1986). Pertinent information from the MKE report has been incorporated into this report.

MKE investigated potential contamination from the sewers at RMA prior to the Ebasco studies. As part of their study, MKE took samples from seven trenches along the chemical sewer in the South Plants area and from one trench along an abandoned line in Section 35, south of the "Dry Basin" (Plate CS-SP-1). A schematic drawing showing the sampling grid and the boring identifications used during the drilling program is presented in Figure CS-SP-4. The trench locations are included in Plate CS-SP-1.

Preliminary results from the MKE analyses show elevated levels of process intermediates, solvents, pesticides, halogenated hydrocarbons, arsenic, and mercury. The analytical results are described below briefly and are summarized in Tables CS-SP-3 and CS-SP-4 (HRO, 1987).

Trench MKE 2

Three 1 ft samples were recovered from this trench, one from either side of the exposed pipe and one from underneath the pipe. These samples contained elevated levels of several volatile and semivolatile organic compounds, including chlorobenzene (4.1 and 10 micrograms per gram, ug/g), carbon tetrachloride (16 and 24 ug/g), chloroform (7.4 and greater than 25 ug/g), methylene chloride (9 and 14 ug/g), tetrachloroethylene (5.5 and 7.6 ug/g), and toluene (13 and 29 ug/g) in the volatile fraction. The semivolatile fraction included aldrin (1,300 to 14,000 ug/g), dieldrin (27 ug/g), isodrin (33 and 290 ug/g), and dibromochloropropane (25 and 7,500 ug/g). No analytical data are available for 12 of the 24 semivolatile target compounds. Arsenic and mercury were also detected at 490 and 520 ug/g, and 0.20 and 5.0 ug/g, respectively.



Source : HRO, 1987

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 1/14/88

FIGURE CS-SP-4

Sampling Grid Used by MKE

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

Table CG-SP-3. Results of HRE Sewer Investigation: Chemical Sewer - South Plants. Page 1 of 4.

Sample	Trench HRE 2**				Trench HRE 3				Trench HRE 4			
	AI	BI	CI	AI	BI	CI	AI	BI	AI	BI	CI	AI
SOIL CHEMISTRY												
Volatiles (ug/g)												
Bicycloheptadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	16	24	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	4.1	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	7.4	GT 25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dimethyl disulfide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	BDL	9.0	14	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
N-tylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-tylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	5.5	7.6	BDL	4.6	BDL	BDL	4.6	BDL	5.1	BDL	BDL	BDL
Toluene	13	29	BDL	3.9	BDL	BDL	3.9	BDL	BDL	BDL	BDL	BDL
Semivolatiles (ug/g)												
Aldrin	14,000	12,000	1300	20,000	20,000	20,000	20,000	20,000	2000	20,000	20,000	20,000
Dibromochloropropane	BDL	7500	25	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	NR	NR	NR	30	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	200	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	27	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Diisopropylmethylphosphonate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Endrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	290	33	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	NR	NR	NR	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic (ug/g)	520	490	BDL	120	200	200	120	200	330	290	290	290
Mercury (ug/g)	BDL	5.0	0.20	1.4	1.5	1.5	1.4	1.5	1.4	2.1	2.1	2.1

BDL - Below detection limit
 GT - Greater than
 NA - Not analyzed
 NR - Not recorded
 * - Signifies bulk sample due to inability to core sample
 ** - Results for 12 of the 24 semivolatiles analytes were not recorded
 Source: HNO, 1987

Table CS-SP-3. Results of NMS Sewer Investigation: Chemical Sewer - South Plants. Page 2 of 4.

Sample	Trench NRI 6**				Trench NMS 7**			
	A1	B1	C1	A1	A2	A3	B1	B2
SOIL CHEMISTRY								
<u>Volatiles (ug/g)</u>								
Bicycloheptadiene	BDL	GT 25	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	2.4	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	12	BDL	BDL	BDL	BDL	BDL	BDL
Dimethyl disulfide	BDL	4.8	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	6.6	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	BDL	BDL	BDL	BDL	BDL	2.4	3.4	BDL
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
M-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	6.1	GT 25	4.1	BDL	BDL	BDL	BDL	BDL
Toluene	4.0	GT 25	BDL	BDL	BDL	BDL	BDL	BDL
<u>Semivolatiles (ug/g)</u>								
Aldrin	710	11,000	840	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	33	510	19	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	NR	NR	NR	NR	NR	NR	NR	NR
Dicyclopentadiene	BDL	BDL	1.6	BDL	BDL	BDL	BDL	BDL
Dieldrin	6.4	140	2.9	BDL	BDL	BDL	BDL	BDL
Diisopropylmethylphosphonate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Endrin	BDL	11	2.0	BDL	BDL	BDL	BDL	BDL
Isodrin	26	300	27	BDL	BDL	BDL	BDL	BDL
Supona	NR	NR	NR	NR	NR	NR	NR	NR
Arsenic (ug/g)	470	500	510	18	BDL	BDL	21	BDL
Mercury (ug/g)	1.0	3.5	1.3	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

GT - Greater than

NA - Not analyzed

NR - Not recorded

** - Results for 12 of the 24 semivolatile analytes were not recorded

Source: HRO, 1987

5062A/1052A

Rev. 2/29/88

Table CB-SP-3. Results of HRE Sewer Investigation: Chemical Sewer - South Plants. Page 3 of 4.

Sample	Trench HRE 7**				Trench HRE 19			Trench HRE 20	
	C1	C2	C3	A1	B1	C1	A2	B*	
SOIL CHEMISTRY									
Volatiles (ug/g)									
Bicycloheptadiene*	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dimethyl disulfide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	BDL	2.7	12	2.7	3.2	4.1	2.9	2.3	2.3
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
N-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Semivolatiles (ug/g)									
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	NR	NR	NR	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Diisopropylmethylphosphonate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Endrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isoodrin	BDL	BDL	NR	BDL	BDL	BDL	BDL	BDL	BDL
Supona	NR	NR	NR	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic (ug/g)	18	BDL	BDL	6.4	11	6.8	BDL	BDL	BDL
Mercury (ug/g)	BDL	BDL	BDL	2.0	25	4.7	BDL	BDL	1.5

BDL - Below detection limit

NA - Not analyzed

NR - Not recorded

* - Signifies bulk sample due to inability to core sample

** - Results for 12 of the 24 semivolatiles analytes were not recorded

Source: HRO, 1987

5062A/1052A

Rev. 2/25/88

Table CS-SF-3. Results of MSE Sewer Investigation: Chemical Sewer - South Plants. Page 4 of 4.

Sample	Trench MSE 20				Trench MSE 21			
	C*	A1	A2	A3	B1	C1	C2	
SOIL CHEMISTRY								
Volatiles (ug/g)								
Bicycloheptadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dimethyl disulfide	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	2.4	BDL	BDL	BDL	2.6	5	8	
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
n-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Semivolatiles (ug/g)								
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Diisopropylmethylphosphonate	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Endrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isoodrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NA - Not analyzed

* - Signifies bulk sample due to inability to core sample

Source: HRO, 1987

Table GS-SP-4. Tentative Identification of Nontarget Compounds - MKE Data. Page 1 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
2	A1	608	520	dichloropyridine
2	B1	548	99	trimethylbenzene
		608	1000	dichloropyridine
		612	410	dichloropyridine
		067	140	trichloromethane
		080	90	tetrachloromethane
		180	37	C3 substituted aliphatic
		128	120	C7 aliphatic
2	C1	565	2.3	hexachlorobutadiene
		585	2.0	chlorinated organic
		587	4.2	pentachloroethane
		592	4.3	octachloro cyclopentene
		601	5.0	chlorinated hydrocarbon
		608	8.8	chlorinated hydrocarbon
		613	4.5	chlorinated hydrocarbon
		642	10.0	hexadecanoic acid
		653	8.8	(trichloroethylidene)bis chlorobenzene
		659	9.6	(trichloroethylidene)bis chlorobenzene
		682	39.0	chlorinated hydrocarbon
		103	2.1	Butanoic acid, methyl ester
		136	180	benzene, ethyl methyl
3	A1	566	84	hexachlorobutadiene
		VOA	4.6	dicyclopentadiene
		VOA	50	dibromochloropropane
		174	210	hexachlorobutadiene

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Table CS-SP-4. Tentative Identification of Nontarget Compounds - MKE Data. Page 2 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
3	B*	566	170	hexachlorbutadiene
		678	120	chlorinated hydrocarbon
		105	2.5	hexane
		174	460	hexachlorobutadiene
4	A*	098	4.9	1-methylcyclopentadiene
		VOA	130	dicyclopentadiene
		VOA	46	dibromochloropropane
		154	5.4	3,4-diethenyl-cyclohexene
		175	230	hexachlorobutadiene
4	B*	104	23	hexane
		VOA	830	dibromochloropropane
		175	310	hexachlorobutadiene
6	A1	566	1.8	hexachlorobutadiene
		574	0.9	methylbenzenedithiol
		576	1.5	hydrocarbon
		583	1.3	hydrocarbon
		588	2.0	diethyl-bi-dioxaborolane dione
		601	6.9	chlordene
		609	1.8	dichlorpyridine
		614	2.5	phthalate
		626	4.7	molecular sulfur
		067	1.4	trichloromethane
		103	1.5	butanoic acid, methyl ester

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

* - Signifies bulk sample due to inability to core sample

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Table CS-SP-4. Tentative Identification of Nontarget Compounds - MCE Data. Page 3 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
6	B1	549	270	trimethylbenzene
		566	30	hexachlorobutadiene
		601	95	chlordene
		609	150	dichloropyridine
		613	72	dichloropyridine
		672	51	pteridinone
		128	210	C6-C8 aliphatic
6	C1	566	10	hexachlorobutadiene
		601	10	chlordene
		605	2.4	cyclic alkene
		626	6.4	molecular sulfur
		128	8.8	C7 aliphatic
7	A1	103	1.0	butanoic acid, methyl ester
7	A2	613	1.8	phthalate
		628	36	unknown alcohol
		103	7.4	butanoic acid, methyl ester (possibly with a coeluter)
7	A3	570	0.7	hexadecanoic acid
		578	3.6	phthalate
		612	0.9	adipate ester
		094	2.7	C6 aliphatic

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Table CS-SP-4. Tentative Identification of Nontarget Compounds - MKE Data. Page 4 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
7	B1	613	0.8	phthalate
		627	30	alcohol
		660	0.4	adipate ester
		665	0.4	phthalate
		668	0.7	phthalate
		674	0.5	phthalate
		674	0.3	phthalate
		682	0.6	phthalate
		094	3.0	C6 aliphatic
7	B2	613	1.8	phthalate
		103	2.4	butanoic acid, methyl ester
7	C1	570	8.9	phthalate
		580	9.8	substituted alkene
		612	2	adipate ester
7	C2	613	2	phthalate
		642	0.5	substituted alkene
		103	4.5	butanoic acid, methyl ester
7	C3	540	0.6	hydrocarbon
		579	4.5	phthalate
		580	27	alcohol
		590	5.1	substituted alkene
		612	1.1	adipate ester
		616	0.3	phthalate
		618	0.4	phthalate
		628	0.4	phthalate
		103	5.0	butanoic acid, methyl ester

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Table CS-SP-4. Tentative Identification of Nontarget Compounds - MKE Data. Page 5 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
19	A1	612	2.9	phthalate ester
		622	14	oxygen substituted alkene
		622	2.3	oxygen substituted alkene
		662	0.7	hexadecanoic acid ester
		104	0.5	C6-C7 aliphatic
19	B1	612	1.6	phthalate ester
		622	18	oxygen substituted alkene
		104	0.6	C6 aliphatic
19	C1	605	0.6	alkane
		612	0.9	phthalate ester
		622	25	oxygen substituted alkene
		104	0.7	C6 aliphatic
20	A2	612	2.4	phthalate ester
		622	19	oxygen substituted alkene
		622	3.1	oxygen substituted alkene
		104	0.9	C6 aliphatic
20	B*	578	4.4	trichlorobenzamine
		621	12	oxygen substituted alkene
		622	2.7	sulfur
		671	2	phthalate ester
		104	0.5	C6 aliphatic

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

* - Signifies bulk sample due to inability to core sample

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Table GS-SP-4. Tentative Identification of Montarget Compounds - MKE Data. Page 6 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
20	C*	578	0.7	trichlorobenzamine
		622	18	oxygen substituted alkene
		671	1	phthalate ester
		104	0.6	C6 aliphatic
21	A1	520	0.2	methylcyclohexane
		525	0.2	methyl benzene
		612	0.5	phthalate ester
		622	6.6	oxygen substituted alkene
		622	1	oxygen substituted alkene
		105	0.5	C5-C6 aliphatic
21	A2	622	2.5	alkene
		612	1.9	phthalate ester
		622	9	oxygen substituted alkene
		662	0.3	hexadecanoic acid, ester
		105	0.7	C6 aliphatic
		671	0.5	phthalate ester
21	A3	612	1.9	phthalate ester
		622	9	oxygen substituted alkene
		662	0.3	hexadecanoic acid, ester
		105	0.7	C6-C7 aliphatic

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)
 2 - Concentrations are order-of-magnitude approximations
 * - Signifies bulk sample due to inability to core sample
 Source: HRO, 1987

0092U/0185A
 Rev. 2/25/88

Table CS-SP-4. Tentative Identification of Nontarget Compounds - MKE Data. Page 7 of 7.

Trench	Interval	Unknown ¹ Number	Concentration ² ug/g	Best Fit
21	B1	612	3.3	phthalate ester
		622	13	oxygen substituted alkene
		622	2.7	alkene
		662	0.6	hexadecanoic acid, ester
		104	0.6	C6 aliphatic
21	C1	605	0.3	alkane
		612	0.6	phthalate ester
		622	10	oxygen substituted alkene
		622	1.6	oxygen substituted alkene
		104	1.2	C6-C7 aliphatic
21	C2	621	9.3	oxygen substituted alkene
		104	1.8	C6 aliphatic

1 - No unknown numbers are given for target compounds detected by volatile organic analysis (VOA)

2 - Concentrations are order-of-magnitude approximations

Source: HRO, 1987

0092U/0185A

Rev. 2/25/88

Several nontarget compounds were tentatively identified as hydrocarbons and halogenated hydrocarbons. The sample from directly beneath the pipe contained these compounds in the highest concentrations. The most notable compounds were those tentatively identified as trimethyl benzene (99 ug/g, equivalent to parts per million, ppm), dichloropyridine (1,000 ug/g), trichloromethane (140 ug/g), and an aliphatic with seven carbons (120 ug/g). The other two samples also contained compounds tentatively identified as ethylmethyl benzene (180 ug/g), dichloropyridine (520 ug/g), and several halogenated hydrocarbons at lower concentrations (39 ug/g or less).

Trench MKE 3

Two samples were collected from this trench. Chloroform, methylene chloride, tetrachloroethylene, and toluene were found in both samples at concentrations ranging from 2 to 12 ug/g. Boring 3 also contained m-xylene and o- or p-xylene at 3.7 and 4.0 ug/g, respectively.

Semivolatile analyses showed elevated levels of several compounds, most notably aldrin, which was present in both samples at 20,000 ug/g. Other semivolatile compounds detected were dieldrin (200 and greater than 10 ug/g), isodrin (300 and greater than 10 ug/g), dibromochloropropane (100 ug/g), dichlorodiphenyltrichloroethane (30 and 100 ug/g), and supona (50 ug/g). Arsenic was found at 120 and 200 ug/g, and mercury was found at 1.4 and 1.5 ug/g.

The primary nontarget compound noted in these samples was tentatively identified as hexachlorobutadiene. It appeared in both samples at concentrations ranging from 84 to 460 ug/g. Two other nontarget compounds of interest were tentatively identified as dibromochloropropane (50 ug/g) and a chlorinated hydrocarbon (120 ug/g).

Trench MKE 4

Two samples were collected from this trench; one from beside the pipe and one from underneath the pipe. In general, the sample from under the pipe contained more target compounds at much higher concentrations than the sample

from beside the pipe. These compounds included carbon tetrachloride (3.7 and 300 ug/g), chloroform (100 ug/g), methylene chloride (5.6 and 5.4 ug/g), tetrachloroethylene (5.1 and 60 ug/g), toluene (greater than 25 ug/g), m-xylene (15 ug/g), o- and p-xylene (13 ug/g), and methylisobutyl ketone (21 ug/g). The semivolatile fraction contained aldrin both beside the pipe and under the pipe at 2,000 and 20,000 ug/g, respectively. Arsenic was found at 330 and 290 ug/g, and mercury was found at 1.4 and 2.1 ug/g.

Nontarget compounds detected at the highest concentrations in these samples included those tentatively identified as dibromochloropropane (46 and 830 ug/g), hexachlorobutadiene (230 and 310 ug/g), and dicyclopentadiene (130 ug/g).

Trench MKE 6

Three samples were collected from Trench MKE 6, two from beside the pipe and one from underneath the pipe. Most of the volatile compounds detected were in the sample directly under the pipe. These compounds included chlorobenzene (2.4 ug/g), chloroform (12 ug/g), bicycloheptadiene (greater than 25 ug/g), ethylbenzene (6.6 ug/g), tetrachloroethylene (6.1, greater than 25, and 4.1 ug/g), toluene (4.0 and greater than 25 ug/g), and dimethyl disulfide (4.8 ug/g). The semivolatile fraction contained pesticides and halogenated hydrocarbons, such as aldrin (710, 11,000, and 840 ug/g), endrin (11 and 2.0 ug/g), dieldrin (6.4, 140, and 2.9 ug/g), isodrin (26, 300, and 27 ug/g), dicyclopentadiene (1.6 ug/g), and dibromochloropropane (33, 510, and 19 ug/g). Arsenic was also found at concentrations ranging from 470 to 510 ug/g, and mercury was found at levels ranging from 1.0 to 3.5 ug/g.

Nontarget compounds were more concentrated in the sample taken from beneath the pipe. Compounds of note in this sample included those tentatively identified as trimethyl benzene (270 ug/g), chlordene (95 ug/g), dichloropyridine (72 and 150 ug/g), and an aliphatic with 6 to 8 carbons (210 ug/g). The samples taken from beside the pipe contained similar compounds, although at much lower concentrations.

Trench MKE 7

Trench MKE 7 yielded eight samples. Methylene chloride was detected in four of the samples in concentrations ranging from 2.4 to 12 ug/g. No semivolatile organic compounds were detected in any of the samples analyzed for semivolatile organics, nor was mercury. Arsenic was found in three of the samples, and ranged in concentration from 18 to 21 ug/g.

Analyses of the samples also showed the presence of several nontarget compounds, including those tentatively identified as phthalates, alcohols, acids, esters, and three instances of a substituted alkene. The phthalates are plasticizers, which are ubiquitous and which were present in low concentrations, the maximum being 8.9 ug/g. Alcohols, esters, and hexadecanoic acid are often associated with naturally occurring compounds and were present in concentrations of up to 36 ug/g. The three substituted alkenes were present in concentrations of 9.8, 0.5, and 5.1 ug/g.

Trench MKE 19

Three samples were collected from Trench MKE 19. Methylene chloride was detected in all three of the samples at concentrations ranging from 2.7 to 4.1 ug/g. No semivolatile organic compounds were detected. Arsenic was found at 6.4, 11, and 6.8 ug/g, and mercury was found at 2.0, 25, and 4.7 ug/g. The highest concentrations of both arsenic and mercury occurred in the sample from directly under the pipe.

The primary nontarget compound was tentatively identified as an oxygen-substituted alkene and was present at 2.3, 14, 18, and 25 ug/g.

Trench MKE 20

Three samples were taken from this trench. Volatile organic analysis showed methylene chloride in all three samples at concentrations ranging from 2.3 to 2.9 ug/g. No semivolatile compounds were detected, nor was arsenic. Mercury was detected in the sample from beneath the pipe at a concentration of 1.5 ug/g.

The primary nontarget compound was found in all three samples and was tentatively identified as an oxygen-substituted alkene. This compound was present at 3.1, 19, 12, and 18 ug/g.

Trench MKE 21

Trench MKE 21 yielded six samples from three borings. Three of these samples contained methylene chloride at concentrations of 2.6, 5.0, and 8.0 ug/g. No semivolatile organic compounds, arsenic, or mercury was detected.

Of the several nontarget compounds detected in these samples, a tentatively identified oxygen-substituted alkene was present in the highest concentrations (1 to 13 ug/g).

Methylene chloride occurs frequently in the results from the MKE field program, usually at concentrations of less than 10 ug/g. This compound is a common laboratory solvent, and its fairly constant concentration in the analytical results may be evidence of laboratory background contamination.

During the sampling program, MKE also took samples from trenches and manholes being investigated by Ebasco. Chemical analyses of these samples showed elevated levels of pesticides, intermediates and metals. The analytical results are described below and are summarized in Table CS-SP-5 (HRO, 1988).

Manhole W21

Three samples were collected from soil underneath Manhole W21 at depths of 8.5 ft, 10.5 ft, and 15.5 ft. The 8.5 ft sample was only analyzed for ICP metals and was reported to contain lead within its indicator range at 29 ppm. Chromium, copper, and zinc were all present above their indicator ranges at concentrations of 51 ppm, 37 ppm, and 120 ppm, respectively. The 10.5 ft interval contained arsenic above its indicator range at a concentration of 430 ppm and the 15.5 ft interval contained arsenic within its indicator range at 3 ppm. Arsenic was the only analyte reported for both of these samples.

Table CS-SP-5. Results of NRE Samples from Ebasco Sampling Locations. Page 1 of 2.

Sample Depth	Manhole W21			Manhole W25		
	8.5 ft	10.5 ft	15.5 ft	7.4 ft	10.0 ft	14.5 ft
SOIL CHEMISTRY						
<u>Volatiles (ug/g)</u>	NR	NR	NR			
Bicycloheptadiene				BDL*	1.9*	BDL*
Carbon tetrachloride				3.6*	3.7*	BDL*
Chloroform				100*	8.9*	BDL*
Methylene chloride				7.6*	3.7*	BDL*
N-xylene				BDL*	5.4*	BDL*
Tetrachloroethylene				BDL*	3.1*	BDL*
Toluene				4.3*	8.0*	BDL*
<u>Semivolatiles (ug/g)</u>	NR	NR	NR			
Aldrin				7000	730	340
Dibromochloropropane				6000	490	BDL
Dichlorodiphenylethane (DDE)				BDL	1.1	BDL
Dichlorodiphenyltrichloroethane (DDT)				70	20	10
Dieldrin				90	7.6	3.2
Hexachlorocyclopentadiene				60	25	BDL
Isodrin				200	23	11
Supona				BDL	1.3	BDL
<u>ICP Metals (ug/g)</u>						
Cadmium	BDL	NR	NR	BDL	BDL	BDL
Chromium	51			BDL	4.2	
Copper	37			41	32	40
Lead	29			28	26	32
Zinc	120			33	100	100
<u>Arsenic (ug/g)</u>	NR	430	3	NR	11	BDL
<u>Mercury (ug/g)</u>	NR	NR	NR	NR	0.14	BDL

BDL - Below detection limit
NR - Not recorded
* - Past holding times

Table CS-SP-5. Results of NRE Samples from Ebasco Sampling Locations. Page 2 of 2.

Sample Depth	Manhole W27				Manhole 4-3			Trench CS01	
	7.0 ft	8.5 ft	9.2 ft	14.0 ft	3.7 ft	11.5 ft	4.1 ft	4.0 ft	
SOIL CHEMISTRY									
<u>Volatiles (ug/g)</u>	NR	NR	NR	NR	BDL*	BDL*	BDL	BDL	
Bicycloheptadiene					BDL*	BDL*	BDL	BDL	BDL
Carbon tetrachloride					BDL*	BDL*	BDL	BDL	BDL
Chloroform					BDL*	BDL*	BDL	BDL	BDL
Methylene chloride					BDL*	BDL*	BDL	BDL	BDL
N-ylene					BDL*	BDL*	BDL	BDL	BDL
Tetrachloroethylene					BDL*	BDL*	BDL	BDL	BDL
Toluene					BDL*	BDL*	BDL	BDL	BDL
<u>Semivolatiles (ug/g)</u>	NR	NR	NR	NR	1.0	BDL	BDL	1.63	
Aldrin					BDL	BDL	BDL	BDL	BDL
Dibromochloropropane					BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane (DDG)					BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane (DDT)					BDL	BDL	3.96	7.56	BDL
Dieldrin					BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene					BDL	BDL	BDL	BDL	BDL
Isodrin					BDL	BDL	NR	NR	NR
Supona					NR	NR			
<u>ICP Metals (ug/g)</u>		NR	NR	NR					
Cadmium	BDL					BDL	BDL	BDL	BDL
Chromium	12					12	6.71	10.1	36.2
Copper	43					15	31.7	52.3	1100
Lead	49					17	29.4	508	4.31
Zinc	140					56	11.1	0.58	1.03
Arsenic (ug/g)	NR	BDL	BDL	BDL	NR	2.6			
Mercury (ug/g)	NR	NR	NR	NR	NR	BDL			

BDL - Below detection limit
NR - Not recorded
* - Past holding times

Manhole W25

Three samples were collected from beneath Manhole W25. The holding times for the volatile analyses were exceeded in all three samples. Although results were reported, values may be lower than they would have been if the samples had been analyzed within the recommended holding time. Volatile analyses showed the presence of seven compounds in the 7.4 ft and 10.0 ft intervals. These were carbon tetrachloride (3.6 and 3.7 ug/g), chloroform (100 and 8.9 ug/g), bicycloheptadiene (1.9 ug/g), methylene chloride (7.6 and 3.7 ug/g), tetrachloroethylene (3.1 ug/g), toluene (4.3 and 8.0 ug/g), and m-xylene (5.4 ug/g). No volatile organic compounds were found in the 14.5 ft sample.

Eight semivolatile organic compounds were found in these borings, and were identified as aldrin (7000, 730, and 340 ug/g), dieldrin (90, 7.6, and 3.2 ug/g), isodrin (200, 23, and 11 ug/g), dibromochloropropane (6000 and 490 ug/g), dichlorodiphenylethane (DDE) (1.1 ug/g), dichlorodiphenyl-trichloroethane (DDT) (70, 20, and 10 ug/g), hexachlorocyclopentadiene (60 and 25 ug/g), and supona (1.3 ug/g).

Of the metals, arsenic was detected once above its indicator range at 11 ug/g in the 10.0 ft interval. Mercury was also detected once above its indicator range at 0.14 ug/g, also in the 10.0 ft interval. ICP metals were found in all three samples from this manhole. Cadmium was detected above its indicator range at 4.2 ug/g in the 14.5 ft interval. Copper was found within its indicator range at 32 ug/g in the 10.0 ft interval and above its indicator range at 41 and 40 ug/g in the 7.4 ft and 14.5 ft intervals, respectively. Lead was found within its indicator range in all three samples at concentrations of 28, 26, and 32 ug/g. Zinc was found above its indicator range in all three samples at concentrations of 93, 100, and 100 ug/g.

Manhole W27

Four samples were collected from beneath Manhole W27. Only analyses for the ICP metals were reported for the 7.0 ft sample. Copper, lead and zinc were all found above their indicator ranges at concentrations of 43, 49, and 140 ug/g, respectively.

Results for the arsenic analysis were the only values reported for the remaining three intervals, 8.5 ft, 9.2 ft, and 14.0 ft. Arsenic was below the certified reporting limit in all three samples.

Manhole 4-3

Two samples were collected from beneath Manhole 4-3 at depths of 3.7 ft and 11.5 ft. No volatile organic compounds were found in either sample, although the holding time for both samples was exceeded at the laboratory. The analysis for semivolatile organic compounds showed aldrin at 1.0 ug/g in the 3.7 ft interval.

No metals were reported for the 3.7 ft interval. Arsenic was detected within its indicator range at a concentration of 2.6 ug/g in the 11.5 ft interval.

Trench CS01

Two samples were collected from beneath pipe joints in this trench, one at 4.1 ft and one at 4.0 ft. No volatile organic compounds were found in either sample. Semivolatile compounds found include aldrin at 1.63 ug/g in the 4.0 ft sample and dieldrin at 3.96 ug/g in the 4.1 ft interval and 7.56 ug/g in the 4.0 ft interval.

Mercury was found above its indicator range in both samples at 0.58 ug/g (4.1 ft interval) and 1.03 ug/g (4.0 ft interval). Arsenic was found above its indicator range at 11.1 ug/g (4.0 ft interval). Copper and lead were detected within their indicator ranges in the 4.1 ft interval at concentrations of 31.7 ug/g and 29.4 ug/g, respectively. Zinc was found above its indicator range in this interval at a concentration of 508 ug/g. Copper, lead, and zinc were all detected above their indicator ranges in the 4.0 ft interval at concentrations of 36.2 ug/g, 52.3 ug/g, and 1100 ug/g, respectively.

3.2 FIELD SURVEY

3.2.1 Field Program

Using the methodology presented in the Task 10 Technical Plan (Ebasco, 1987b/RIC 87336R30), 14 manholes were inspected and soil samples were collected from beneath five manholes and from three sewer line trenches.

Samples were also collected from eight trenches excavated by Morrison-Knudson Engineers. These investigations yielded 87 samples for chemical analysis and 16 samples for physical analysis. Pressure lines were not hydrostatically tested at the request of the Facilities Engineer. Plate CS-SP-1 shows the locations of manholes and trenches investigated as part of this study.

No borehole clearance for safety purposes was conducted along the sewer line, as there was no likelihood of unexploded ordnance, buried metals, or other buried objects.

Manholes were inspected to determine the condition of the corbels, rims, walls, aprons, and channels and to verify the positions and alignments of lines. Several of the manholes inspected were in poor condition, with damage that included deteriorated aprons and channels, gaps at inlet and outlet connections, and cracked or missing bricks and mortar in the corbels. Table CS-SP-6 is a summary of the observations.

In addition to the manholes in the South Plants area, a manhole was located in the southwestern corner of Section 36. The manhole is of brick and mortar construction and is labeled with a yellow No. 1. It was found south of the southwestern corner of the lime settling basins (Plate CS-SP-1). A line exits this manhole and heads northeast to a concrete ditch where it emerges immediately south of pit No. 2. This manhole appears to be part of the original 30 inch chemical sewer line, which emptied into the lime settling basins (WR&SK, 1943). The outlet from this line was found blocked with brick and mortar.

Borings were completed beneath Manholes W21, W25, W27, 4-3, and 6-1. Samples were collected at approximately 5 ft intervals from the bottom of the manhole to the water table. The apron and channel of Manholes W21 and W25 are composed of deteriorated brick. In Manhole W27, the corbel appears to have been repaired or replaced. The apron is concrete and lies above the inlet and outlet. A portion has been broken to provide access to the pipes. Borings in Manholes 4-3 and 6-1 penetrated 0.3 to 1 ft of concrete before reaching soil.

Table CS-SP-6. Manhole Reconnaissance Survey Observations. Page 1 of 1.

Manhole	Depth (ft)	Material	Rim	Walls	Apron	Channel	Connections	Comments
W21	7.6	brick	cracked	brick missing at base	brick	brick and VCP	gaps	
W25	6.4	brick	no problems noted	white stains	brick	not solid	gaps	
W26	9.2 to sediment	brick	no problems noted	gaps in mortar, brick missing	no problems noted	no problems noted	no problems noted	bottom filled with sediment
W27	5.1	concrete	broken	precast	broken for access to inlet and outlet	none	no problems noted	concrete floor is above inlet and outlet
W29	4 to sediment	brick	no problems noted	cracked bricks, orange stain	no problems noted	no problems noted	no problems noted	bottom filled with sediment
6-1	9.2	brick	no problems noted	cracked bricks, gaps in mortar	brick	soft in some areas	no problems noted	
4-3	about 3	brick	no problems noted	broken bricks at top	soft	not continuous	no problems noted	
1-5	9.5	brick	cracked	cracked bricks	no problems noted	no problems noted	no problems noted	approximately 3 ft of sediment in bottom
1-2	not measured	brick	no problems noted	cracked bricks, moisture	no problems noted	white deposits	no problems noted	corroded open metal grates
1-3	not measured	brick	no problems noted	cracked bricks	no problems noted	white deposits	no problems noted	storm drain with metal grates
A	8.9	precast concrete	no problems noted	no problems noted	concrete	concrete	no problems noted	
B	5.7	precast concrete	no problems noted	concrete with bricks at base	concrete	concrete	no problems noted	
C		precast concrete	no lid	no problems noted	no problems noted	no problems noted	no problems noted	filled with trash and dirt, could only see about 3 ft down
1	11	brick	no problems noted	no problems noted	no problems noted	no problems noted	no problems noted	small amount of standing water

Dye and excavation studies were performed at the three trench sites: CS01, located between Manholes W17 and W18; CS02, located between Manholes W26 and W27; and CS03, located between Manholes I2 and I3. During the dye study, segments of the sewer line were blocked at the manholes with inflatable plugs, and were filled completely with a solution of Rhodamine B, a red dye, for 24 hours.

Excavation exposed the top and one side of ten joints in Trenches CS01 and CS03 and nine joints in Trench CS02. A sample grid was set up in each trench, which consisted of samples collected from beneath the pipe, from a boring located 1 ft from the pipe drilled to the water table, and from a boring located 5 ft from the pipe drilled to a depth of 15 ft below the pipe or to the water table. The grid was centered on the joint that appeared to have leaked the most dye. Samples for physical analyses also were taken from the trenches beneath the pipe and along the haunch of the pipe. The distribution of analytes detected within or above their indicator levels and the boring grid locations in the trenches are presented in Figures CS-SP-6a through -6l, Section 3.2.4 of this report.

In Trench CS01, the pipe is vitrified clay, 6 inches in diameter with 3 ft sections and mortar joints. Dye stains were noted on all joints (most notably, Joint 6) and in the soil along the pipe between Joints 3 and 5. The sample grid was set up on Joint 6 (Figure CS-SP-6b, Section 3.2.4). Additional samples were collected at Joints 3 and 10 where yellow stains were observed. A composite grab sample (Sample 10) of the yellow material was collected from along the top of the pipe. Physical samples were collected upstream of Joint 5.

During drilling of Boring 8, a sample was planned for the 13 to 14 ft interval, as measured from the ground surface. The sample was not recovered because the polybutyrate tube became stuck in the barrel; therefore, a sample was taken instead from the 14 to 15 ft interval. Boring 9 was drilled deeper than planned, to the water table, in order to verify the water level observed in Boring 8. A replacement sample, Boring 11, was collected because the holding time for semivolatile analyses was exceeded at the laboratory for

Boring 1. The replacement sample was analyzed only for semivolatile organic compounds and thiodiglycol.

The section of sewer line exposed in Trench CS02 is 10 inches in diameter and is made of vitrified clay in 3 ft sections, and has cement mortar joints. Only nine joints and eight pipe lengths were exposed at the excavation because of underground pipes and a concrete foundation uncovered at the northern end of the trench. Dye stains were noted at Joints 2, 3, 4, 5, and 8 and along the lower half of the pipe between Joints 2 and 4. The pipe segment between Joints 3 and 4 had two longitudinal cracks through which dye had leaked. It was noted that prior to this investigation Joints 7, 8, and 9 had been patched with concrete. As a result of these observations, a sampling grid was set up around Joint 3 (Figure CS-SP-6c, Section 3.2.4). An additional sample was collected from beneath Joint 8 because dye had leaked from the concrete patch. Physical samples were collected at the midpoint of the section between Joints 3 and 4.

The pipe excavated in Trench CS03 was 18 inch vitrified clay pipe with cement mortar joints. Most pipe sections showed cracking on the bells and some longitudinal cracks. Dye stains were noted on all joints, and Joint 6 showed the most extensive staining. Dye also leaked from a longitudinal crack that ran along the top of the pipe from Joint 2 past Joint 10, and from two longitudinal cracks along the side of the pipe from Joint 4 to Joint 6. Based on these observations, a sampling grid was set up around Joint 6 (Figure CS-SP-6d, Section 3.2.4). An additional sample was taken from above the section of pipe between Joints 5 and 6, and physical samples were taken at Joint 5 and upstream of Joint 10.

Samples were also collected for physical and chemical analysis from the eight MKE trench locations. Samples for chemical analysis were collected from beneath exposed joints, and one sample for physical analysis was collected from each trench. In Trenches MKE 2, MKE 6, MKE 7, MKE 19, and MKE 20, three joints were exposed and samples were collected from beneath each joint. In Trench MKE 4, four joints were exposed; however, a sample could not be

recovered from Joint 1. Only two joints were exposed in Trench MKE 21. In Trench MKE 3, three joints were exposed and there was no recovery at Joint 2.

The South Plants chemical sewer system was investigated during the winter of 1986-1987. A total of 68 borings, yielding 103 samples for chemical or physical analysis, were completed in the South Plants chemical sewer as shown in Table CS-SP-7.

Samples were analyzed by gas chromatography/mass spectrometry (GC/MS) for volatile and semivolatile organic compounds; by an inductively coupled argon plasma (ICP) screen for metals; and by separate analysis for arsenic, mercury, and thiodiglycol. Samples from directly beneath the sewer line or in the first interval in a trench were not analyzed for volatile organics because these soils were in contact with the atmosphere. Any volatile organics would have escaped by the time the samples were collected. Samples from MKE trenches were not analyzed for volatile organics or thiodiglycol, and a separate analysis was conducted for dibromochloropropane in samples from Trenches MKE 2, 3, 4, and 6. Appendix CS-B presents the specific target analytes for which laboratory analyses were conducted. Physical samples were analyzed for fluid content, density, compaction, and grain size to determine if the pipe had been properly designed and installed.

3.2.2 Field Observations

To ensure safety, in situ air monitoring was conducted during sampling operations using a photoionization detector (HNU) and an organic vapor analyzer (OVA). HNU readings were recorded above background levels in 37 samples. Elevated OVA readings were noted in 21 samples. These readings are presented in Table CS-SP-8, Section 3.2.4 of this report.

Table CS-SP-7
BORINGS, DEPTHS, AND SAMPLES

Page 1 of 3

		Depth From Ground	Depth Beneath	
		<u>Surface (ft)</u>	<u>Sewer Invert (ft)</u>	<u>No. of Samples</u>
Boring No.				
Manhole W21		28.0	20.4	5
Manhole W25		27.2	20.8	5
Manhole W27		27.2	22.1	5
Manhole 4-3		25.5	17.6	5
Manhole 6-1		30.0	20.8	4

Trench	Boring No.	Depth From Ground	Depth Beneath	
		<u>Surface (ft)</u>	<u>Sewer Invert (ft)</u>	<u>No. of Samples</u>
CS01	1	5.0	1.0	1
(Bottom	2	5.0	1.0	1
of Pipe	3	5.0	1.0	1
Depth =	4	5.0	1.0	1
4.0 ft)	5	5.0	1.0	1
	6	5.0	1.0	1
	7	5.0	1.0	1
	8	16.0	12.0	3
	9	23.0	19.0	5
	10 ⁺	NA	NA	1
	11	5.0	1.0	1
	12*	5.0	1.0	2
CS02	1	8.8	1.0	1
(Bottom	2	8.8	1.0	1
of Pipe	3	8.8	1.0	1
Depth =	4	8.8	1.0	1
7.8 ft)	5	8.8	1.0	1
	6	8.8	1.0	1
	7	12.8	5.0	2
	8	12.8	5.0	2
	9*	8.8	1.0	2

*grab sample
*physical sample

<u>Trench</u>	<u>Boring No.</u>	<u>Depth From Ground Surface (ft)</u>	<u>Depth Beneath Sewer Invert (ft)</u>	<u>No. of Samples</u>
CS03	1	12.5	1.0	1
(Bottom	2	12.5	1.0	1
of Pipe	3	12.5	1.0	1
Depth =	4	12.5	1.0	1
11.5 ft)	5	12.5	1.0	1
	6	26.5	15.0	4
	7	26.5	15.0	4
	8**	10.8	-0.7	1
	9*	11.8	0.3	1
	10*	12.3	0.8	1
	11*	11.5	0.0	1
	12*	12.5	1.0	1
MKE 2	1	6.8	1.1	1
(Bottom	2	6.5	0.7	1
of Pipe	3	6.8	1.2	1
Depth =	Physical*	6.1	0.3	1
5.8 ft)				
MKE 3	1	9.5	0.9	1
(Bottom	3	9.9	1.3	1
of Pipe	Physical*	9.3	0.7	1
Depth =				
8.6 ft)				
MKE 4	2	8.5	0.9	1
(Bottom	3	8.5	0.9	1
of Pipe	4	7.9	0.3	1
Depth =	Physical*	8.0	0.4	1
7.6 ft)				

*physical sample

** Sample was taken above the pipe where dye was noted.

<u>Trench</u>	<u>Boring No.</u>	<u>Depth From Ground Surface (ft)</u>	<u>Depth Beneath Sewer Invert (ft)</u>	<u>No. of Samples</u>
MKE 6	1	8.8	0.5	1
(Bottom	2	9.2	0.9	1
of Pipe	3	9.2	0.9	1
Depth = Physical*		8.5	0.2	1
8.3 ft)				
MKE 7	1	6.4	0.7	1
(Bottom	2	6.7	1.0	1
of Pipe	3	6.5	0.8	1
Depth = Physical*		6.3	0.6	1
5.7 ft)				
MKE 19	1	4.4	0.9	1
(Bottom	2	4.6	1.1	1
of Pipe	3	4.2	0.7	1
Depth = Physical*		4.2	0.7	1
3.5 ft)				
MKE 20	1	4.8	0.7	1
(Bottom	2	4.5	0.4	1
of Pipe	3	5.0	0.9	1
Depth = Physical*		4.5	0.4	1
4.1)				
MKE 21	1	9.0	1.1	1
(Bottom	2	9.0	1.1	1
of Pipe	Physical*	8.3	0.4	1
Depth =				
7.9 ft)				

*physical sample

An M18A2 test kit was used to monitor for the presence of chemical agents in the borehole and samples according to standard operating procedures. The M18A2 is used as a backup test if an M8 alarm is triggered, as a substitute for an M8, and as a specific check for the presence of mustard. The M18A2 detects G agents, V agents, all forms of mustard, and lewisite. Specifically at RMA, the M18A2 test kit is used to detect GB (sarin), VX, H (mustard), HD (distilled mustard), and L (lewisite), based upon the knowledge that these agents were manufactured, stored, or demilitarized at the site. The detection limit for all mustard agents is 0.5 milligrams per cubic meter (mg/m^3); the detection limit for all G agents, VX, and L is $0.2 \text{ mg}/\text{m}^3$.

No chemical agents were detected during the field program by the M18A2 monitoring. No unexploded ordnance, buried metal, or other objects were detected during sampling.

3.2.3 Geophysical Exploration

No geophysical exploration of the South Plants chemical sewer system was conducted as unexploded ordnance, buried metal, or other buried objects were not likely to be present.

3.2.4 Analyte Levels and Distribution

A wide range of target and nontarget analytes were detected in samples from along the chemical sewer in South Plants. The number of samples containing each analyte, and the concentration range, mean, median, standard deviation, detection limit, and indicator level are listed in Table CS-SP-8. The results of geologic field observations, air monitoring during drilling, and the chemical analysis of each soil sample are summarized in Table CS-SP-9. Results from the analyses of the physical samples for fluid content, dry density, compacted fluid content and compacted dry density are presented in Table CS-SP-10. Grain size distributions as determined from the physical samples are presented in Figures CS-SP-5a-p. The distribution of the analytes detected within or above their indicator levels in the field program is presented in Figures CS-SP-6a-l. A tabulation of all analytical data associated with the field program is presented in Appendix CS-B.

Table CS-SP-8. Summary of Analytical Results for Chemical Sewers - South Plants. Page 1 of 1.
Concentration (ug/g)

Constituent Detected	Number of Samples*	Range	Median**	Mean**	Standard Deviation**	DataChem Detection Limit	CAL Detection Limit	Indicator Level
Volatiles (N=63)								
1,2-Dichloroethane	1	40	-	-	-	0.6	0.3	DL
1,1,1-Trichloroethane	1	0.5	-	-	-	0.4	0.3	DL
1,1,2-Trichloroethane	1	0.8	-	-	-	0.4	0.3	DL
Benzene	6	1-20	1	5	8	0.3	0.3	DL
Bicycloheptadiene	18	0.7-70	6	10	20	0.4	0.3	DL
Carbon tetrachloride	21	0.4-200	10	40	60	0.3	0.3	DL
Chloroform	22	0.8-400	6	30	80	0.3	0.3	DL
Chlorobenzene	7	2-20	4	8	8	1.0	0.3	DL
Dibromochloropropane	17	6-7000	1000	2000	2000	2.0	0.4	DL
Dicyclopentadiene	1	2	-	-	-	0.7	0.3	DL
Ethylbenzene	2	3-20	-	-	-	0.4	0.3	DL
m-Xylene	10	0.9-100	2	10	30	0.8	0.7	DL
Methylene chloride	12	1-9	2	3	2	2.0	0.7	DL
Methylisobutyl ketone	1	5	-	-	-	0.7	0.3	DL
o- and p-Xylene	3	9-40	-	-	-	5.0	0.3	DL
Tetrachloroethylene	27	0.5-90	4	10	20	0.3	0.3	DL
Toluene	18	0.4-300	20	70	100	0.3	0.3	DL
Trichloroethylene	1	0.6	-	-	-	0.5	0.3	DL
Semivolatiles (N=85)								
Aldrin	33	0.4-40,000	100	4000	9000	0.3	0.3	DL
Atrazine	2	4-10	-	-	-	0.3	0.3	DL
Chlorophenylmethyl sulfone	1	0.3	-	-	-	0.3	0.6	DL
Dibromochloropropane	26	0.4-20,000	80	2000	5000	0.3	0.3	DL
Dichlorodiphenylethane	5	0.8-7	2	3	2	0.6	0.3	DL
Dichlorodiphenyltrichloroethane	14	0.8-500	20	60	100	0.5	0.6	DL
Dicyclopentadiene	1	8	-	-	-	1.0	0.4	DL
Dieldrin	30	0.3-200	5	30	50	0.3	0.3	DL
Hexachlorocyclopentadiene	14	0.7-4000	50	700	1000	0.6	0.3	DL
Isodrin	23	1-1000	30	100	200	0.3	0.3	DL
Parathion	2	20-30	-	-	-	0.9	0.4	DL
Supona	12	0.7-30	3	9	10	0.6	0.3	DL
Dibromochloropropane (N=11)	11	13-32,000	260	3700	9600	0.005	0.014	DL
ICP Metals (N=86)								
Cadmium	14	1.3-34	5.8	8.9	9.5	0.74	0.66	1.0-2.0
Chromium	58	7.8-72	13	15	11	6.5	5.2	25-40
Copper	84	10-1500	34	52	160	4.7	4.9	20-35
Lead	47	8.4-640	23	47	93	8.4	12.7	25-40
Zinc	85	26-820	89	110	120	8.7	9.5	60-80
Arsenic (N=86)	40	3.3-740	12	66	160	2.5	5.0	DL-10
Mercury (N=86)	39	0.057-8.8	0.39	1.4	2.2	0.050	0.060	DL-C.10
Thiodiglycol (N=57)								
Thiodiglycol	2	3.2-14	-	-	-	4.2	0.0	DL
Chloroacetic acid	1	230	-	-	-	35.5	0.0	DL

DL - The indicator level is the detection limit for DataChem and CAL Laboratories, as appropriate

N - Number of samples analyzed

* - Number of samples in which the constituent was detected

** - Median, mean, and standard deviation not calculated when constituent detected in fewer than 5 samples
Task 10; 5086A/1052A; Rev. 7/01/88

Table CB-SP-9. Results of Field Study. Page 1 of 24.

Depth (feet)	Geologic Material	MH W21					MH W25		
		8.0-9.0	12.0-13.0	17.0-18.0	22.0-23.0	27.0-28.0	6.9-7.9	11.8-12.8	16.2-17.2
		Sandy Claystone	Sandy Claystone	Sandy Claystone w/Gravel	Sandy Siltstone	Claystone Siltstone	Sandy Gravel/Clayey Sand w/Silt	Clayey Sandstone Trace Silt	Sandy Clayey Siltstone
Percent PineasVO		90	90	75	65	80	0/30	35	70
AIR MONITORING									
Volatile Organic Readings (ppm)									
HNUS		BDL	BDL	2	BDL	BDL	18	5	15
OVAS		NR	NR	NR	NR	NR	80	60	30
SOIL CHEMISTRY									
Volatiles (ug/g)									
1,2-Dichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene		2	0.7	2	BDL	1	20	1	BDL
Bicycloheptadiene		5	0.4	0.7	BDL	BDL	20	8	BDL
Carbon tetrachloride		20	5	1	0.8	7	400	6	BDL
Chloroform		5	BDL	2	BDL	BDL	20	BDL	BDL
Chlorobenzene		800	70	6	BDL	BDL	6000	2000	BDL
Dibromochloropropane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene		20	1	BDL	BDL	BDL	100	1	BDL
m-Xylene		BDL	3	BDL	BDL	BDL	6	9	BDL
Methylene chloride		BDL	5	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone		20	BDL	BDL	BDL	BDL	40	BDL	BDL
o- and p-Xylene		9	0.7	0.9	BDL	BDL	40	5	BDL
Tetrachloroethylene		20	3	BDL	BDL	0.5	300	7	BDL
Toluene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene									

BDL - Below detection limit

BDL - Background

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HNU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CB-SP

4936A/1052A

Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 2 of 24.

Depth (feet)	MH W21					MH W25		
	8.0-9.0	12.0-13.0	17.0-18.0	22.0-23.0	27.0-28.0	6.9-7.9	11.8-12.8	16.2-17.2
SOIL CHEMISTRY (Continued)								
<u>Semivolatiles (ug/g)</u>								
Aldrin	50	BDL	100	BDL	10	10000	200	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	0.5	BDL	0.4	10000	80	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	70	5	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	0.8	BDL	1	100	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	90	BDL	BDL
Isodrin	1	BDL	10	BDL	BDL	300	BDL	BDL
Perathion	BDL	BDL	30	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	3	BDL	4	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA	NA
<u>ICP Metals (ug/g)</u>								
Cadmium	10	BDL	BDL	BDL	BDL	5.0	BDL	BDL
Chromium	45	BDL	BDL	BDL	BDL	12	BDL	11
Copper	36	34	BDL	40	42	42	43	38
Lead	25	BDL	25	16	14	22	18	BDL
Zinc	98	85	99	89	99	92	85	95
Arsenic (ug/g)	300	46	12	BDL	BDL	130	BDL	BDL
Mercury (ug/g)	BDL	BDL	BDL	BDL	BDL	8.8	0.065	BDL
<u>Thiodiglycol (ug/g)</u>								
Thiodiglycol	BDL	3.2	BDL	BDL	BDL	14	BDL	BDL
Chloroacetic acid	NA	NA	NA	NA	NA	230	BDL	BDL

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 3 of 24.

Depth (feet) Geologic Material	MW W25 (cont.)			MW W27			
	21.2-22.1 Clayey Silty Sandstone	26.2-27.2 Gravelly Sandstone Trace Clay	6.5-7.5 Concrete/ Silty Clayey Sandstone	11.5-12.5 Sandstone w/Silt and Clay	16.2-17.2 Silty Claystone w/Sand/ Sandstone w/Silt and Clay	21.2-22.2 Sandstone w/ Clay and Silt	26.2-27.2 Silty Sandstone w/Clay
Percent Pine/VO	30	5	0/20	10	90/10	10	30
AIR MONITORING							
Volatile Organic Readings (ppm)							
HNDS	63	50	NRD	4	30	30	50
OVAS	95	85	NRD	20	30	30	100
SOIL CHEMISTRY							
Volatiles (ug/g)							
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	1	BDL	BDL	BDL
Benzene	BDL	BDL	2	30	4	1	2
Bicycloheptadiene	BDL	BDL	BDL	20	10	2	4
Carbon tetrachloride	BDL	BDL	BDL	5	10	7	10
Chloroform	BDL	1	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	200	400	30	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene	BDL	BDL	BDL	BDL	2	2	3
Methylene chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene	BDL	BDL	BDL	10	0.9	BDL	BDL
Tetrachloroethylene	BDL	BDL	4	50	10	1	3
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NRD - Background

S - As referenced to calibration standard of methane for OVA, and benzene for HNDS; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Table CS-SP-9. Results of Field Study. Page 4 of 24.

Depth (feet)	MW W25 (cont.)					MW W27				
	21.2-22.1	26.2-27.2	6.5-7.5	11.5-12.5	16.2-17.2	21.2-22.2	26.2-27.2			
SOIL CHEMISTRY (Continued)										
Semivolatiles (ug/g)										
Aldrin	BDL	NA	100	90	100	BDL	BDL	7	BDL	
Atrazine	BDL	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chlorophenylmethyl sulfone	BDL	NA	BDL	0.3	BDL	BDL	BDL	BDL	BDL	
Dibromochloropropane	BDL	NA	10	50	100	9	BDL	BDL	BDL	
Dichlorodiphenylethane	BDL	NA	2	BDL	BDL	BDL	BDL	BDL	BDL	
Dichlorodiphenyltrichloroethane	BDL	NA	30	2	0.8	BDL	BDL	BDL	BDL	
Dicyclopentadiene	BDL	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Dieldrin	BDL	NA	90	2	1	BDL	BDL	BDL	BDL	
Hexachlorocyclopentadiene	BDL	NA	BDL	0.8	0.7	BDL	BDL	BDL	BDL	
Isodrin	BDL	NA	BDL	6	3	BDL	BDL	BDL	BDL	
Parathion	BDL	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Supona	BDL	NA	BDL	2	0.7	BDL	BDL	BDL	BDL	
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA	NA	NA	
ICP Metals (ug/g)										
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chromium	BDL	16	16	17	72	10	14	BDL	BDL	
Copper	37	26	41	36	38	41	39	BDL	BDL	
Lead	14	18	49	24	BDL	16	23	BDL	BDL	
Zinc	95	110	130	100	84	86	93	BDL	BDL	
Arsenic (ug/g)	BDL	BDL	15	BDL	BDL	BDL	BDL	BDL	BDL	
Mercury (ug/g)	BDL	BDL	2.0	0.061	BDL	BDL	BDL	BDL	BDL	
Thiodiglycol (ug/g)										
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Chloroacetic acid	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 5 of 24.

Depth (feet) Geologic Material	MH 4-3				MH 6-1		
	3.2-4.2 Concrete/ Silty Clayey Sand	8.2-9.2 Clayey Silty Sand	12.2-13.2 Clayey Silty Sand	17.2-18.2 Silty Sand w/Clay	22.2-23.2 Silty Sand w/Clay	12.5-13.5 Silty Sand Trace Clay	17.5-18.5 Clayey, Silty Sand
Percent PinesVO	0/20	25	40	40	30	20	30
AIR MONITORING							
Volatile Organic Readings (ppm)							
HMUS	NR	NR	NR	NR	NR	NR	NR
OWAS	NR	NR	NR	NR	NR	NR	NR
SOIL CHEMISTRY							
Volatiles (ug/g)							
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bicycloheptadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	1	1	1	1	1	1	1
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	BDL	0.6	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NR - Not recorded

S - As referenced to calibration standard of methane for CWA, and benzene for HMU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Table CS-SP-3. Results of Field Study. Page 6 of 24.

Depth (feet)	MH 4-3				MH 6-1		
	3.2-4.2	8.2-9.2	12.2-13.2	17.2-18.2	22.2-23.2	12.5-13.5	17.5-18.5
SOIL CHEMISTRY (Continued)							
<u>Semivolatiles (ug/g)</u>							
Aldrin	2	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	B. L.	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA
<u>ICP Metals (ug/g)</u>							
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	21	12	20	21	BDL	BDL	BDL
Copper	13	10	14	20	19	47	42
Lead	19	8.4	16	14	20	36	12
Zinc	54	37	82	72	73	85	110
Arsenic (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (ug/g)	BDL	BDL	BDL	BDL	BDL	BDL	BDL
<u>Thiodiglycol (ug/g)</u>							
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroacetic acid	BDL	BDL	BDL	BDL	BDL	NA	BDL
							NA

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 7 of 24.

		Trench CS01					
		MW6-1 (Cont.)	Boring 1	Boring 2	Boring 3	Boring 4	Boring 5
Depth (feet)		23.5-24.5	4.0-5.0	4.0-5.0	4.0-5.0	4.0-5.0	4.0-5.0
Geologic Material		Mudstone	Claystone	Sandy Claystone w/Gravel	Sandy Claystone w/Gravel	Sandy Claystone	Sandy Claystone
Percent Pines	VO	50	100	65	65	70	70
AIR MONITORING							
Volatile Organic Readings (ppm)							
HMUS		0.2	NR	NR	NR	NR	NR
OVAS		1.2	BKD	BKD	BKD	BKD	BKD
SOIL CHEMISTRY							
Volatiles (ug/g)							
1,2-Dichloroethane		BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane		0.5	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane		BDL	BDL	BDL	BDL	BDL	BDL
Benzene		BDL	BDL	BDL	BDL	BDL	BDL
Bicycloheptadiene		0.6	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride		BDL	BDL	BDL	BDL	BDL	BDL
Chloroform		BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene		BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane		BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene		BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene		BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene		BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride		BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone		BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene		BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene		1	BDL	BDL	BDL	BDL	BDL
Toluene		BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene		BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BKD - Background

NR - Not recorded

S - As referenced to calibration standard of methane for GVA, and benzene for HMU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-

4936A/1052A

Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 8 of 24.

		Trench CS01							
		MH6-1 (Cont.)		Boring 1	Boring 2	Boring 3	Boring 4	Boring 5	Boring 6
Depth (feet)		23.5-24.5	29.0-30.0	4.0-5.0	4.0-5.0	4.0-5.0	4.0-5.0	4.0-5.0	4.0-5.0
SOIL CHEMISTRY (Continued)									
Semivolatiles (ug/g)									
Aldrin	BDL	BDL	BDL	NA*	BDL	BDL	0.4	BDL	BDL
Atrazine	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	NA*	BDL	BDL	0.3	2	2
Dieldrin	BDL	BDL	BDL	NA*	0.5	0.5	0.3	2	2
Hexachlorocyclopentadiene	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	NA*	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA	NA	NA
ICP Metals (ug/g)									
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	BDL	BDL	BDL	11	15	11	12	13	14
Copper	46	30	30	40	35	34	34	33	32
Lead	19	28	28	BDL	BDL	BDL	BDL	BDL	BDL
Zinc	100	80	80	140	110	120	160	120	110
Arsenic (ug/g)	BDL	BDL	BDL	9.5	6.5	12	5.3	12	8.2
Mercury (ug/g)	BDL	BDL	BDL	0.10	BDL	BDL	0.16	0.075	0.12
Thiodiglycol (ug/g)									
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroacetic acid	NA	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NA - Not analyzed

* - Exceeded laboratory holding time

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 9 of 24.

Trench CS01									
Depth (feet)	Geologic Material	Boring 7		Boring 8		Boring 9			
		4.0-5.0 Clayey Sandstone	4.0-5.0 Sandy Claystone	8.0-9.0 Sandy Claystone	14.0-15.0 Claystone w/Gravel	4.0-5.0 Clayey Sandstone	8.0-9.0 Sandy Claystone	13.0-14.0 Sandy Claystone	18.0-19.0 Sandy Claystone
Percent FinesVO		30	60	70	55	40	60	60	55
AIR MONITORING									
Volatile Organic Readings (ppm)									
HMUS		NR	BKD	1.5	BKD	1	40	80	2
OVAS		BKD	BKD	NR	NR	2	250	160	8
SOIL CHEMISTRY									
Volatiles (ug/g)									
1,2-Dichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bicycloheptadiene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride		2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene		6	BDL	3	BDL	BDL	BDL	BDL	BDL
Toluene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene		BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BKD - Background

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HMU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP

4936A/1052A

Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 10 of 24.

Depth (feet)	Trench CS01				Boring 9			
	Boring 7	Boring 8	Boring 9	Boring 9	Boring 9	Boring 9	Boring 9	Boring 9
	4.0-5.0	4.0-5.0	8.0-9.0	14.0-15.0	4.0-5.0	8.0-9.0	13.0-14.0	18.0-19.0
SOIL CHEMISTRY (Continued)								
Semi-volatiles (ug/g)								
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA	NA
ICP Metals (ug/g)								
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	11	14	13	13	BDL	BDL	BDL	BDL
Copper	51	37	34	34	BDL	BDL	BDL	BDL
Lead	BDL	16	BDL	BDL	BDL	BDL	BDL	BDL
Zinc	260	110	110	110	86	76	73	99
Arsenic (ug/g)	15	24	BDL	BDL	BDL	BDL	BDL	BDL
Mercury (ug/g)	0.26	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Thiodiglycol (ug/g)								
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroacetic acid	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 11 of 24.

	Trench CS01 (continued)					Trench CS02				
	Boring 9 (cont.)	Grab 10	Boring 11	Boring 1	Boring 2	Boring 3	Boring 4	Boring 5		
Depth (feet)	22.0-23.0	3.0	4.0-5.0	7.8-8.8	7.8-8.8	7.8-8.8	7.8-8.8	7.8-8.8		
Geologic Material	Sandy Claystone	Composite Grab Sample	Claystone	Sandy Claystone	Silty Clay w/Sand	Sandy Silt w/Clay/Silty Claystone	Silty Clay w/Sand	Silty Clay w/Sand		
Percent Fine/VO	55	100		75	90	70/95	95	90		

AIR MONITORING

Volatile Organic Readings (ppm)

HNUS	10	NR	NR	NR	NR	NR	NR	NR	NR	NR
OVAS	20	NR	NR	NR	NR	NR	NR	NR	NR	NR

SOIL CHEMISTRY

Volatiles (ug/g)

1,2-Dichloroethane	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	BDL	NA	NA	20	50	30	9	10	10	10
Bicycloheptadiene	BDL	NA	NA	90	100	60	20	40	40	40
Carbon tetrachloride	BDL	NA	NA	40	30	20	3	20	20	20
Chloroform	BDL	NA	NA	20	BDL	BDL	2	BDL	BDL	BDL
Chlorobenzene	BDL	NA	NA	7000	5000	5000	5000	4000	4000	4000
Dibromochloropropane	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene	BDL	NA	NA	3	3	0.9	2	BDL	BDL	BDL
Methylene chloride	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	BDL	NA	NA	20	30	10	10	6	6	6
Toluene	BDL	NA	NA	200	200	90	90	30	30	30
Trichloroethylene	BDL	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NR - Not analyzed

NA - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HNU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP

4936A/1052A

Rev. 7/01/88

Table CS-SP-3. Results of Field Study. Page 12 of 24.

		Trench CS01 (continued)					Trench CS02				
		Boring 9 (cont.)	Grab 10	Boring 11	Boring 1	Boring 2	Boring 3	Boring 4	Boring 5		
Depth (feet)		22.0-23.0	3.0	4.0-5.0	7.8-8.8	7.8-8.8	7.8-8.8	7.8-8.8	7.8-8.8	6.8	
SOIL CHEMISTRY (Continued)											
Semivolatile (ug/g)											
Aldrin	BDL	BDL	BDL	1	500	20000	200	1000	5000		
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	4000	6000	BDL	BDL	BDL		
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Dicyclopentadiene	BDL	BDL	BDL	BDL	50	BDL	6	70	BDL		
Dieldrin	BDL	BDL	BDL	BDL	500	BDL	50	100	BDL		
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	70	BDL	20	200	BDL		
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Parathion	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Supona	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Dibromochloropropane (ug/g)											
ICP Metals (ug/g)											
Cadmium	BDL	BDL	BDL	NA	BDL	1.3	BDL	BDL	BDL		
Chromium	9.4	64	35	NA	8.5	13	BDL	8.3	BDL		
Copper	30	39	26	NA	16	32	16	24	BDL		
Lead	BDL	820	13	NA	79	99	32	53	BDL		
Zinc	73	BDL	BDL	NA	26	31	12	12	BDL		
Arsenic (ug/g)	BDL	BDL	BDL	NA	80	0.51	0.44	0.19	0.48		
Mercury (ug/g)	BDL	BDL	BDL	NA	0.51	0.45					
Thiodiglycol (ug/g)											
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		
Chloroacetic acid	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL		

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 13 of 24.

Trench CS02 (continued)				Trench CS03		
	Boring 6	Boring 7	Boring 8	Boring 1	Boring 2	Boring 3
Depth (feet)	7.8-8.8	7.8-8.8	7.8-8.8	11.5-12.5	11.5-12.5	11.5-12.5
Geologic Material	Silty Clay	Silty Sand w/Clay	Sandy Silt w/Clay/Clayey Siltstone w/Clay	Sand	Sand/Claystone	Sand/Claystone
Percent PineVO	100	40	50	0	0/100	0/100
AIR MONITORING						
Volatile Organic Readings (ppm)						
HMUS	BDL	52	99	BDL	BDL	BDL
OVAS	NR	BDL	BDL	BDL	NR	NR
SOIL CHEMISTRY						
Volatiles (ug/g)						
1,2-Dichloroethane	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	5	BDL	BDL	BDL	BDL
Benzene	0.9	6	BDL	BDL	BDL	BDL
Bicycloheptadiene	5	10	BDL	BDL	9	BDL
Carbon tetrachloride	3	2	BDL	BDL	BDL	BDL
Chloroform	BDL	4	BDL	BDL	BDL	BDL
Chlorobenzene	200	60	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	2	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene	BDL	4	BDL	BDL	BDL	BDL
Tetrachloroethylene	2	2	BDL	3	3	BDL
Toluene	0.7	0.4	BDL	BDL	BDL	BDL
Trichloroethylene	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HNU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 14 of 24.

Trench CS02 (continued)							Trench CS03		
Depth (feet)	Boring 6	Boring 7	Boring 8	Boring 1	Boring 2	Boring 3			
	7.8-8.8	7.8-8.8	11.8-12.8	7.8-8.8	11.8-12.8	11.5-12.5			
SOIL CHEMISTRY (Continued)									
Semi-volatiles (ug/g)									
Aldrin	20000	20000	40000	3	1000	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	0.4	200	BDL	BDL	BDL	BDL
Dibromochloropropane	4000	BDL	20000	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	500	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	200	BDL	BDL	BDL	BDL	3000	BDL	4000	300
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	40	BDL	BDL	BDL	BDL
Isodrin	400	BDL	1000	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA	NA	NA	NA
ICP Metals (ug/g)									
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	9.8	9.0	BDL	BDL	7.8	11	19	16	
Copper	34	25	26	25	17	15	19	21	
Lead	61	BDL	BDL	BDL	BDL	640	150	22	
Zinc	90	77	74	67	54	62	72	73	
Arsenic (ug/g)	10	11	BDL	BDL	BDL	BDL	BDL	BDL	
Mercury (ug/g)	1.3	0.64	0.29	BDL	0.057	0.066	0.093	BDL	
Thiodiglycol (ug/g)									
Thiodiglycol	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NA*
Chloroacetic acid	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	NA*

BDL - Below detection limit

NA - Not analyzed

* - Exceeded laboratory holding time

Table CS-SP-9. Results of Field Study. Page 15 of 24.

Depth (feet)	Geologic Material	Trench CS03 (continued)				
		Boring 4	Boring 5	Boring 6	Boring 7	Boring 7
11.5-12.5	Silty Sand Trace Clay	11.5-12.5 Silty Sand w/Clay	11.5-12.5 Sand w/Clay/ Clayey Silty stone w/Gravel	15.5-16.5 Sandy Claystone	20.5-21.5 Sandy Claystone	25.5-26.5 Sandy Claystone w/Silt
45	Percent PineWO	45	5/50	90	80	70
					45	60

AIR MONITORING

Volatile Organic Readings (ppm)

HMUS	BDL	BDL	12	11	2.0	1.5	BDL	BDL
OVAS	BDL	BDL	5.1	11.5	9.0	1.5	NR	NR

SOIL CHEMISTRY

Volatiles (ug/g)

1,2-Dichloroethane	40	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,1-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
1,1,2-Trichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Benzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Bicycloheptadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Carbon tetrachloride	3	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chloroform	2	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorobenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Ethylbenzene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
m-Xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylene chloride	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Methylisobutyl ketone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
o- and p-Xylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Tetrachloroethylene	10	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Trichloroethylene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL

BDL - Below detection limit

BDL - Background

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HMU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP

4936A/1052A

Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 16 of 24.

Trench CS03 (continued)						
Depth (feet)	Boring 4		Boring 5		Boring 6	
	11.5-12.5	11.5-12.5	11.5-12.5	11.5-12.5	15.5-16.5	20.5-21.5
SOIL CHEMISTRY (Continued)						
Semi-volatiles (ug/g)						
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	1	BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene	2000	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA
ICP Metals (ug/g)						
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	15	14	BDL	BDL	BDL	BDL
Copper	26	38	BDL	BDL	BDL	BDL
Lead	22	BDL	BDL	BDL	BDL	BDL
Zinc	83	100	BDL	BDL	BDL	BDL
Arsenic (ug/g)	3.3	3.4	BDL	BDL	BDL	BDL
Mercury (ug/g)	0.087	BDL	BDL	BDL	BDL	BDL
Thiodiglycol (ug/g)						
Thiodiglycol	NA*	NA*	BDL	BDL	BDL	BDL
Chloroacetic acid	NA*	NA*	BDL	BDL	BDL	BDL

BDL - Below detection limit
 NA - Not analyzed
 * - Exceeded laboratory holding time

Table CS-SP-9. Results of Field Study. Page 17 of 24.

Depth (feet)	Geologic Material	Trench CS03 (continued)			Trench MKB 2			Trench MKB 3		
		Boring 7	Boring 8	Boring 1	Boring 2	Boring 3	Boring 1	Boring 3	Boring 1	Boring 3
20.5-21.5	Sandy Siltstone	25.5-26.5	10.8	5.9-6.0	5.7-6.5	5.8-6.8	8.7-9.5	9.6-9.9	8.7-9.5	9.6-9.9
	Trace Clay	Clayey Silty Sandstone	Silty Clayey Sand	Clayey Sand	Silty Sand w/Gravel	Silty Sand	Clayey Sand w/Gravel	Gravelly Sand	Clayey Sand w/Gravel	Gravelly Sand
Percent PinesVO	55	20	30	20	40	50	20	20	20	0

AIR MONITORING

Volatile Organic Readings (ppm)

HNUS	BDL	BDL	BDL	90	90	85	30	20
OVAS	BDL	BDL	BDL	NR	NR	NR	NR	NR

SOIL CHEMISTRY

Volatiles (ug/g)

1,2-Dichloroethane	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Benzene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Bicycloheptadiene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Chloroform	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Dibromochloropropane	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Dicyclopentadiene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
m-Xylene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Methylene chloride	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Methylisobutyl ketone	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
o- and p-Xylene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Toluene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	BDL	BDL	BDL	NA	NA	NA	NA	NA	NA	NA

BDL - Below detection limit

BDL - Background

NA - Not analyzed

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HNUS; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 18 of 24.

Depth (feet)	Trench CS03 (continued)				Trench ME2			Trench ME3	
	Boring 7	Boring 8	Boring 1	Boring 2	Boring 3	Boring 1	Boring 3	Boring 1	Boring 3
	20.5-21.5	25.5-26.5	10.8	5.9-6.8	5.7-6.5	5.8-6.8	8.7-9.5	9.6-9.9	
SOIL CHEMISTRY (Continued)									
Semi-volatiles (ug/g)									
Aldrin	BDL	BDL	BDL	100	100	100	100	100	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	32000	370	6900	95	13	
ICP Metals (ug/g)									
Cadmium	BDL	BDL	BDL	4.2	5.8	5.8	3.1	2.8	
Chromium	BDL	BDL	BDL	9.7	11	9.8	9.7	11	
Copper	33	28	11	55	1500	84	18	75	
Lead	BDL	BDL	BDL	73	89	38	24	BDL	
Zinc	77	96	45	86	120	230	38	83	
Arsenic (ug/g)	7.1	BDL	3.6	140	190	130	150	BDL	
Mercury (ug/g)	BDL	BDL	BDL	2.3	0.7	4.7	0.58	0.27	
Thiodiglycol (ug/g)									
Thiodiglycol	NA*	NA*	BDL	NA	NA	NA	NA	NA	
Chloroacetic acid	NA*	NA*	BDL	NA	NA	NA	NA	NA	

BDL - Below detection limit

NA - Not analyzed

* - Exceeded laboratory holding time

Site CS-SP
4936A/1052A
Rev. 7/01/98

Table CS-SP-9. Results of Field Study. Page 19 of 24.

Depth (feet)	Trench MKE 4			Trench MKE 6		
	Boring 2	Boring 3	Boring 1	Boring 2	Boring 3	
Geologic Material	7.7-8.2 Clayey Silty Sand	7.7-8.2 Clayey Silty Sand	7.6-7.9 Silty Sand w/Clay	8.2-9.2 Claystone	8.6-9.2 Silty Claystone	
Percent Fines ^{VO}	40	40	30	60	100	100

AIR MONITORING

Volatile Organic Readings (ppm)

HNUIS	20	20	6	50	18	50
OVAS	NR	NR	NR	NR	NR	NR

SOIL CHEMISTRY

Volatiles (ug/g)

1,2-Dichloroethane	NA	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA	NA
Bicycloheptadiene	NA	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA	NA
m-Xylene	NA	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA	NA
Methylisobutyl ketone	NA	NA	NA	NA	NA	NA
o- and p-Xylene	NA	NA	NA	NA	NA	NA
Tetrachloroethylene	NA	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA	NA
Trichloroethylene	NA	NA	NA	NA	NA	NA

NA - Not analyzed

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HNU, reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP

4936A/1052A

Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 20 of 24.

Depth (feet)	Trench MKR 4				Trench MKR 6			
	Boring 2	Boring 3	Boring 4	Boring 1	Boring 2	Boring 3		
	7.7-8.2	7.7-8.2	7.6-7.9	8.2-8.8	8.2-9.2	8.6-9.2		
SOIL CHEMISTRY (Continued)								
Semivolatiles (ug/g)								
Aldrin	BDL	20	20	200	300	600		
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL		
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL		
Dibromochloropropane	200	20	50	300	100	50		
Dichlorodiphenylethane	0.8	2	BDL	7	BDL	BDL		
Dichlorodiphenyltrichloroethane	10	40	30	BDL	BDL	BDL		
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL		
Dieldrin	30	3	2	BDL	40	10		
Hexachlorocyclopentadiene	20	BDL	30	BDL	BDL	BDL		
Isodrin	40	2	1	20	20	40		
Parathion	BDL	BDL	BDL	BDL	BDL	BDL		
Supona	20	2	BDL	8	BDL	BDL		
Dibromochloropropane (ug/g)	540	70	60	440	260	55		
ICP Metals (ug/g)								
Cadmium	5.3	7.7	6.6	34	27	6.3		
Chromium	BDL	BDL	BDL	21	8.3	11		
Copper	36	42	32	150	37	43		
Lead	BDL	BDL	BDL	97	35	17		
Zinc	90	100	72	480	100	190		
Arsenic (ug/g)	120	150	170	740	600	250		
Mercury (ug/g)	0.092	0.39	2.2	8.6	3.4	1.6		
Thiodiglycol (ug/g)								
Thiodiglycol	NA	NA	NA	NA	NA	NA		
Chloroacetic acid	NA	NA	NA	NA	NA	NA		

BDL - Below detection limit
NA - Not analyzedSite CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 21 of 24.

	Trench MKS 7				Trench MKS 19			
	Boring 1	Boring 2	Boring 3		Boring 1	Boring 2	Boring 3	
Depth (feet)	5.7-6.4	5.7-6.7	5.8-6.5		3.6-4.4	3.6-4.6	3.4-4.2	
Geologic Material	Clayey Silty Sand	Silty Sand	Clayey Silty Sand		Sandy Clay	Silty Clay	Sandy Silty Clay	
Percent PinesVO	20	40	30		60	80	70	
AIR MONITORING								
Volatile Organic Readings (PPM)								
EWAS	BKD	BKD	BKD		BKD	BKD	BKD	
OVAS	NR	NR	NR		NR	NR	NR	
SOIL CHEMISTRY								
Volatiles (ug/g)								
1,2-Dichloroethane	NA	NA	NA		NA	NA	NA	
1,1,1-Trichloroethane	NA	NA	NA		NA	NA	NA	
1,1,2-Trichloroethane	NA	NA	NA		NA	NA	NA	
Benzene	NA	NA	NA		NA	NA	NA	
Bicycloheptadiene	NA	NA	NA		NA	NA	NA	
Carbon tetrachloride	NA	NA	NA		NA	NA	NA	
Chloroform	NA	NA	NA		NA	NA	NA	
Chlorobenzene	NA	NA	NA		NA	NA	NA	
Dibromochloropropane	NA	NA	NA		NA	NA	NA	
Dicyclopentadiene	NA	NA	NA		NA	NA	NA	
Ethylbenzene	NA	NA	NA		NA	NA	NA	
m-Xylene	NA	NA	NA		NA	NA	NA	
Methylene chloride	NA	NA	NA		NA	NA	NA	
Methylisobutyl ketone	NA	NA	NA		NA	NA	NA	
o- and p-Xylene	NA	NA	NA		NA	NA	NA	
Tetrachloroethylene	NA	NA	NA		NA	NA	NA	
Toluene	NA	NA	NA		NA	NA	NA	
Trichloroethylene	NA	NA	NA		NA	NA	NA	

BKD - Background

NA - Not analyzed

NR - Not recorded

S - As referenced

VO - As determined by visual observation and rounded to the nearest 5 percent

reading has been adjusted to account for background level

Site CS-SP

4936A/1052A

Rev. 7/01/86

Table CS-SP-9. Results of Field Study. Page 22 of 24.

Depth (feet)	Trench MKE 7			Trench MKE 19		
	Boring 1	Boring 2	Boring 3	Boring 1	Boring 2	Boring 3
	5.7-6.4	5.7-6.7	5.8-6.5	3.6-4.4	3.6-4.6	3.4-4.2
SOIL CHEMISTRY (Continued)						
<u>Semivolatile (ug/g)</u>						
Aldrin	BDL	BDL	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	BDL	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA
<u>ICP Metals (ug/g)</u>						
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	13	14	15	17	BDL	BDL
Copper	13	13	16	71	44	41
Lead	19	14	15	13	BDL	BDL
Zinc	49	48	57	97	95	85
Arsenic (ug/g)	BDL	BDL	BDL	7.1	5.1	14
Mercury (ug/g)	BDL	BDL	BDL	3.5	0.18	5.4
Thiodiglycol (ug/g)						
Thiodiglycol	NA	NA	NA	NA	NA	NA
Chloroacetic acid	NA	NA	NA	NA	NA	NA

BDL - Below detection limit
NA - Not analyzed

Site CS-SP
4936A/1052A
Rev. 7/01/88

Table CS-SP-9. Results of Field Study. Page 23 of 24.

	Trench MKZ 20			Trench MKZ 21	
	Boring 1	Boring 2	Boring 3	Boring 1	Boring 2
Depth (feet)	4.2-4.8	4.0-4.5	4.1-5.0	8.0-9.0	7.8-9.0
Geologic Material	Sandy Clay	Clayey Sand	Sandy Clay	Clayey Sand/ Sandy Clay	Sandy Clay
Percent PinesVO	50	45	60	40/70	80

AIR MONITORING

Volatile Organic Readings (ppm)

HMUS	1.0	BKD	BKD	BKD	BKD
OVAS	NR	NR	NR	NR	NR

SOIL CHEMISTRY

Volatiles (ug/g)

1,2-Dichloroethane	NA	NA	NA	NA	NA
1,1,1-Trichloroethane	NA	NA	NA	NA	NA
1,1,2-Trichloroethane	NA	NA	NA	NA	NA
Benzene	NA	NA	NA	NA	NA
Bicycloheptadiene	NA	NA	NA	NA	NA
Carbon tetrachloride	NA	NA	NA	NA	NA
Chloroform	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA
Dibromochloropropane	NA	NA	NA	NA	NA
Dicyclopentadiene	NA	NA	NA	NA	NA
Ethylbenzene	NA	NA	NA	NA	NA
m-Xylene	NA	NA	NA	NA	NA
Methylene chloride	NA	NA	NA	NA	NA
Methylisobutyl ketone	NA	NA	NA	NA	NA
o- and p-Xylene	NA	NA	NA	NA	NA
Tetrachloroethylene	NA	NA	NA	NA	NA
Toluene	NA	NA	NA	NA	NA
Trichloroethylene	NA	NA	NA	NA	NA

BKD - Background

NA - Not analyzed

NR - Not recorded

S - As referenced to calibration standard of methane for OVA, and benzene for HMU; reading has been adjusted to account for background level

VO - As determined by visual observation and rounded to the nearest 5 percent

Site CS-SP

4936A/1052A

Rev. 7/01/88

Table CS-SF-9. Results of Field Study. Page 24 of 24.

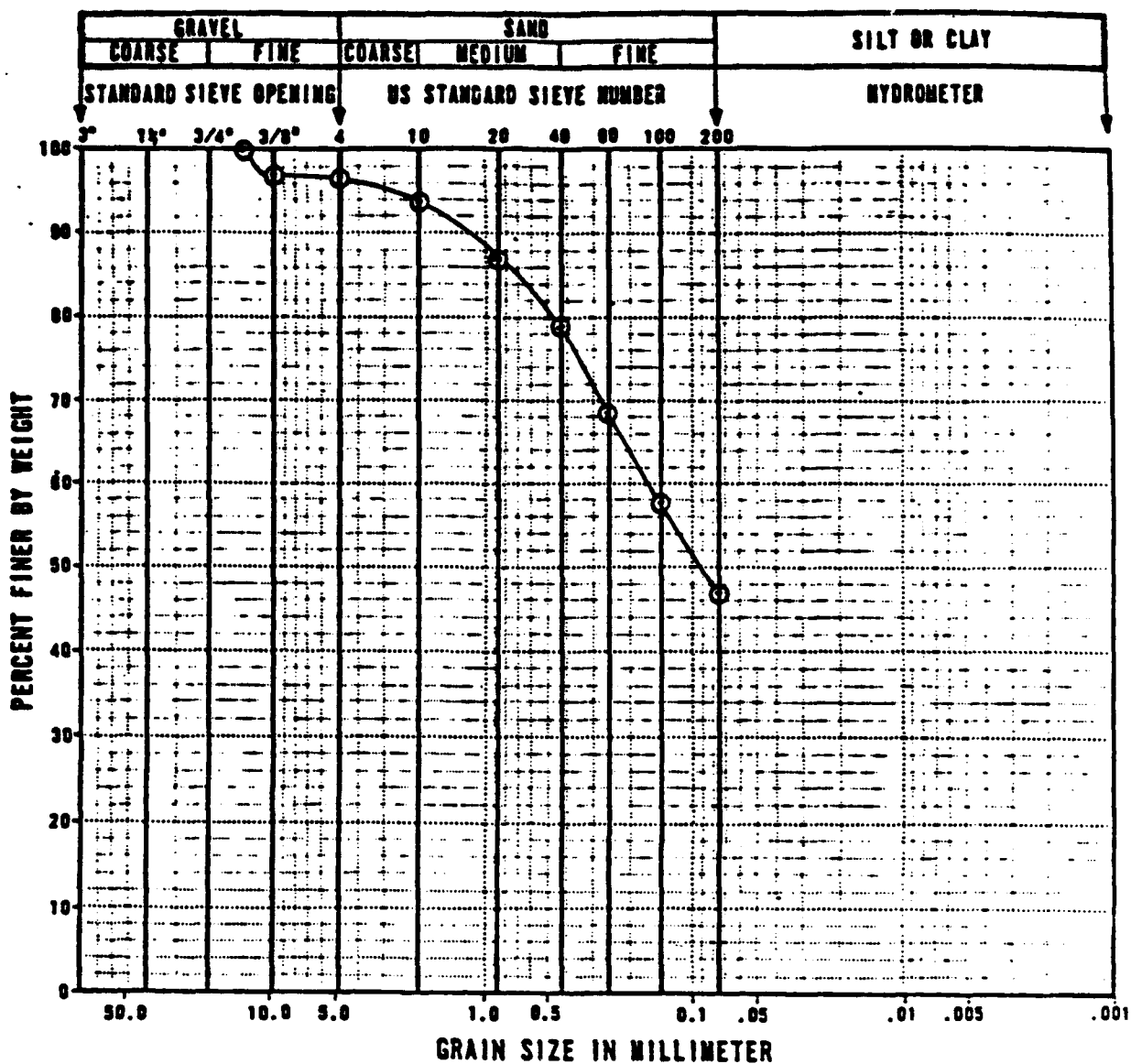
Depth (feet)	Trench MKE 20			Trench MKE 21		
	Boring 1	Boring 2	Boring 3	Boring 1	Boring 2	
	4.2-4.8	4.0-4.5	4.1-5.0	8.0-9.0	7.8-9.0	
SOIL CHEMISTRY (Continued)						
Semivolatiles (ug/g)						
Aldrin	0.6	BDL	BDL	BDL	BDL	BDL
Atrazine	BDL	BDL	BDL	BDL	BDL	BDL
Chlorophenylmethyl sulfone	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane	0.6	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenylethane	BDL	BDL	BDL	BDL	BDL	BDL
Dichlorodiphenyltrichloroethane	BDL	BDL	BDL	BDL	BDL	BDL
Dicyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Dieldrin	BDL	BDL	0.3	BDL	BDL	BDL
Hexachlorocyclopentadiene	BDL	BDL	BDL	BDL	BDL	BDL
Isodrin	BDL	BDL	BDL	BDL	BDL	BDL
Parathion	BDL	BDL	BDL	BDL	BDL	BDL
Supona	BDL	BDL	BDL	BDL	BDL	BDL
Dibromochloropropane (ug/g)	NA	NA	NA	NA	NA	NA
ICP Metals (ug/g)						
Cadmium	BDL	BDL	BDL	BDL	BDL	BDL
Chromium	14	BDL	18	13	14	14
Copper	32	80	40	19	17	17
Lead	29	52	56	28	18	18
Zinc	150	160	760	68	58	58
Arsenic (ug/g)	4.4	BDL	3.4	BDL	BDL	BDL
Mercury (ug/g)	0.17	BDL	0.13	BDL	BDL	BDL
Thiodiglycol (ug/g)						
Thiodiglycol	NA	NA	NA	NA	NA	NA
Chloroacetic acid	NA	NA	NA	NA	NA	NA

BDL - Below detection limit
NA - Not analyzed

Site CS-SF
4936A/1052A
Rev. 7/01/88

Table CS-SP-10. Summary of Soil Properties, Indexes and Harvard Miniature Compaction Test. Page 1 of 1.

Trench No.	Boring No.	Depth (ft)	Fluid Content, %	Dry Density, Pounds per Cubic Foot	Compacted Fluid Content, %	Compacted Dry Density, Pounds per Cubic Foot
1001CS01	12	3.6-4.0	25.5	79.0	26.5	88
1001CS01	12	4.0-5.0	23.0	87.5	23.0	88
1001CS02	9	7.2-7.8	31.0	75.0	38.0	76
1001CS02	9	7.8-8.8	26.5	87.5	30.0	85
1002CS03	9	11.2-11.8	13.5	106.0	17.5	108
1002CS03	10	11.8-12.3	27.5	89.8	32.5	85
1002CS03	11	10.8-11.5	30.0	90.0	29.0	91
1102CS03	12	11.5-12.5	35.0	85.0	32.5	88
1001MKE02	Physical	5.3-6.1	24.0	78.0	22.5	80
1001MKE03	Physical	8.5-9.3	15.5	100.0	21.5	102
1001MKE04	Physical	7.0-8.0	22.0	87.0	23.0	91
1001MKE06	Physical	7.5-8.5	34.5	79.0	33.0	79
1035MKE07	Physical	5.5-6.3	11.5	100.5	10.5	112
1001MKE19	Physical	3.4-4.2	28.5	82.0	27.5	93
1001MKE20	Physical	3.9-4.5	23.0	89.0	22.5	87
1002MKE21	Physical	7.5-8.3	21.0	95.0	18.0	107



Source : The Earth Technology Corporation, 1987a

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

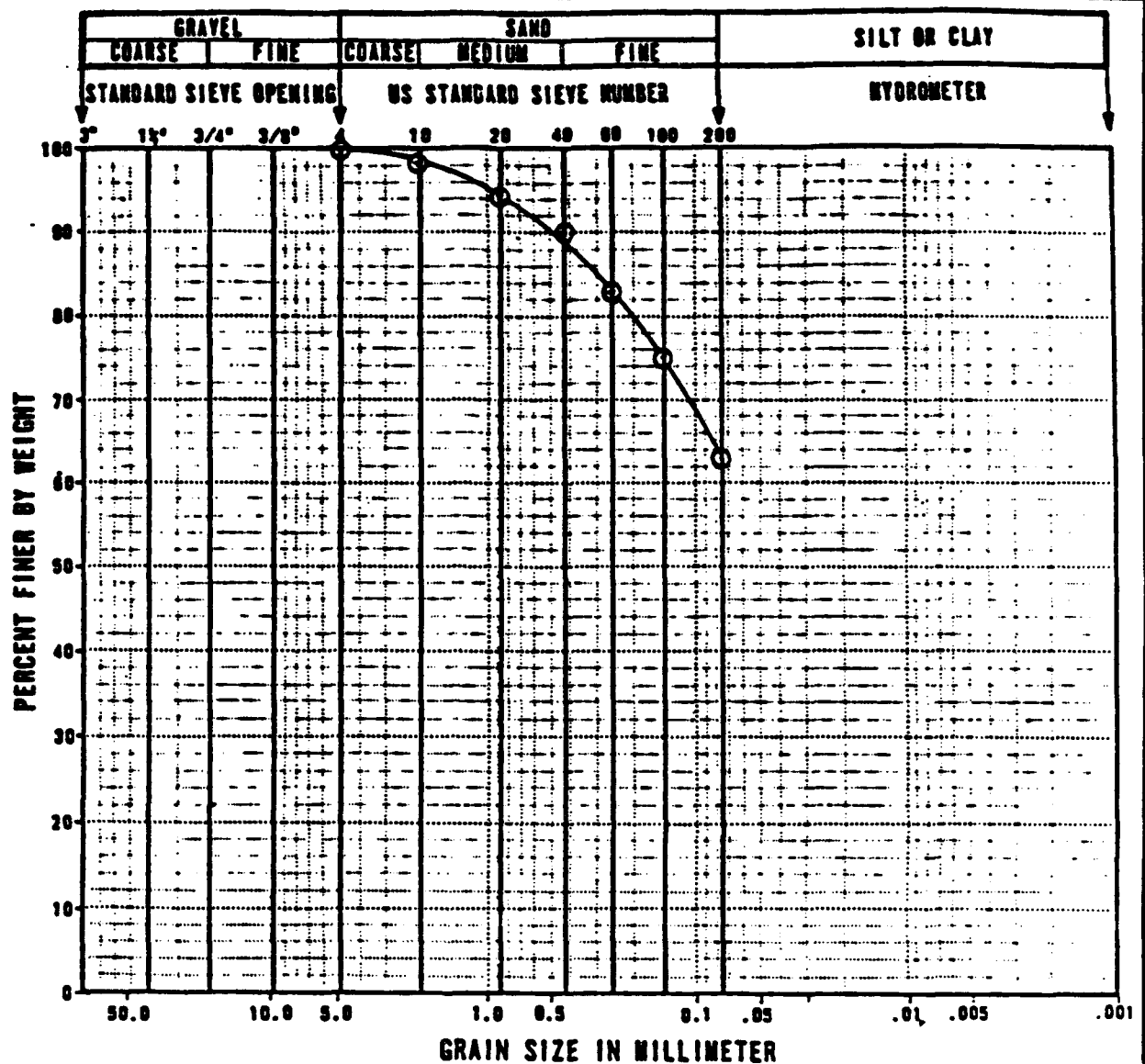
Drafted: 10/15/87

FIGURE CS-SP-5a

Grain Size Distribution Curve
Boring 12, 3.6 - 4.0 ft., Trench CSOI,
Section 1

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987a

Prepared for:

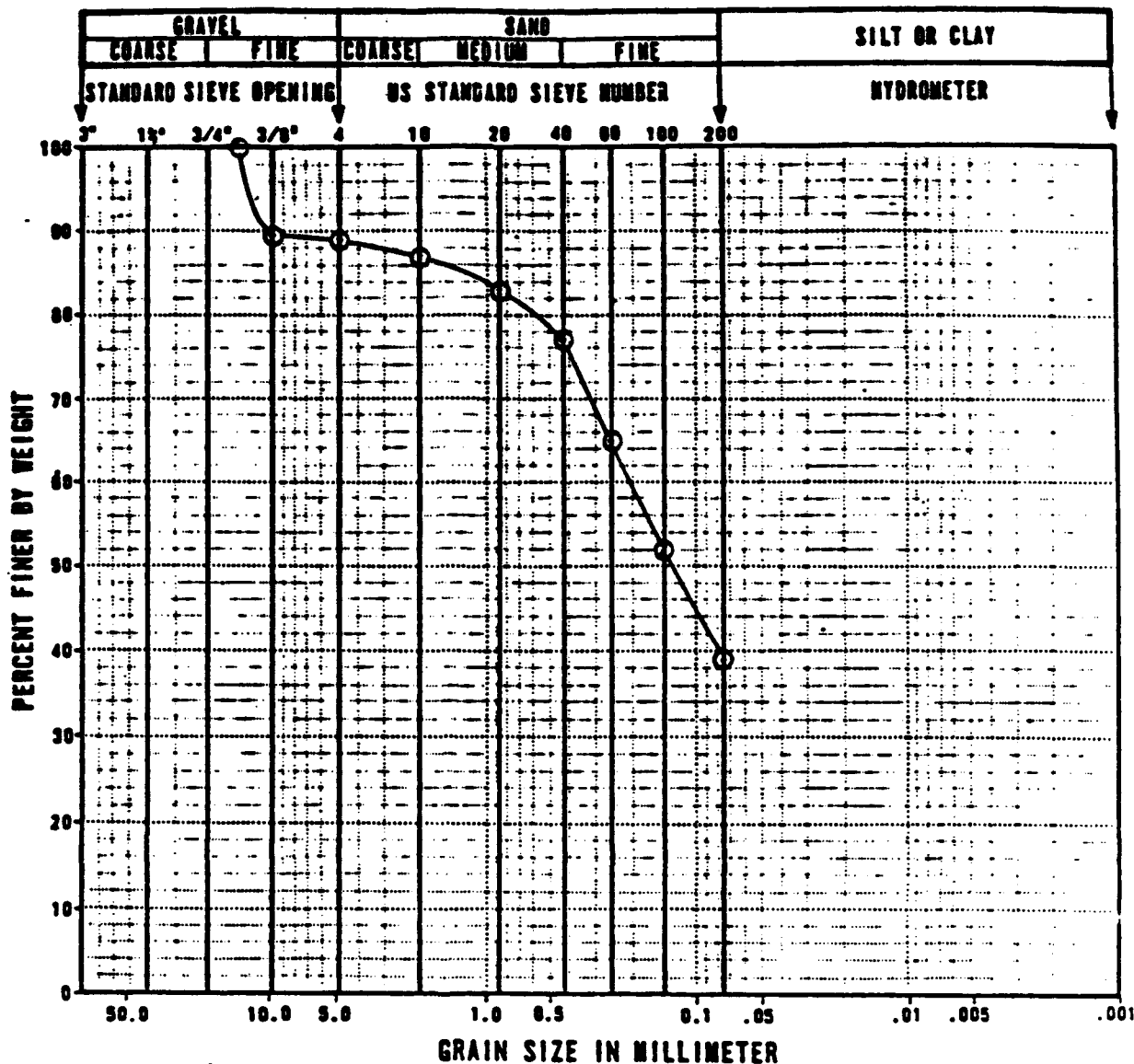
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 10/16/87

FIGURE CS-SP-5b

Grain Size Distribution Curve Boring 12,
4.0-5.0 ft., Trench CS01,
Section 1
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987a

Prepared for:

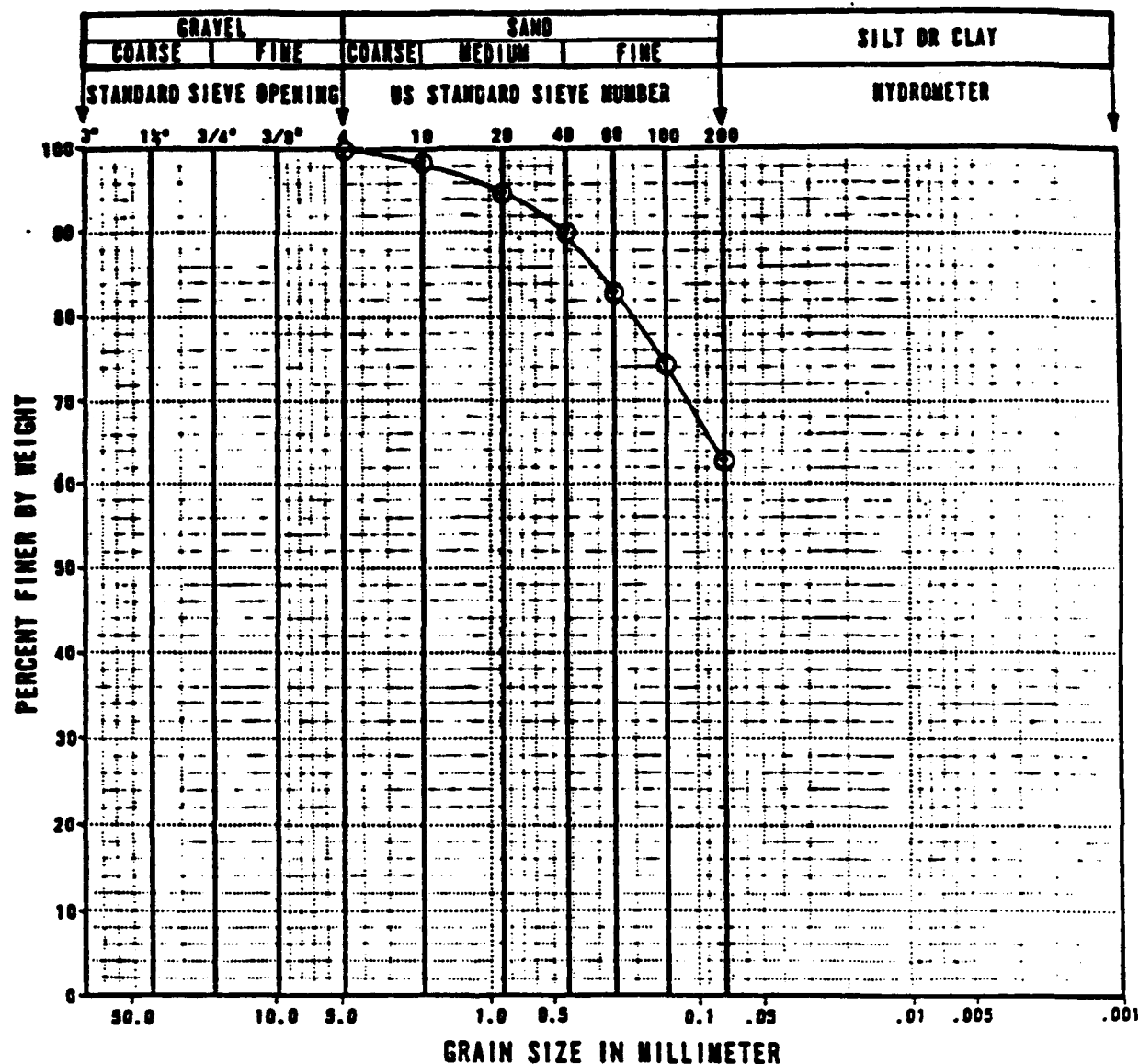
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 10/16/87

FIGURE CS-SP-5c

Grain Size Distribution Curve
Boring 9, 7.2 - 7.8 ft., Trench CS02,
Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987a

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

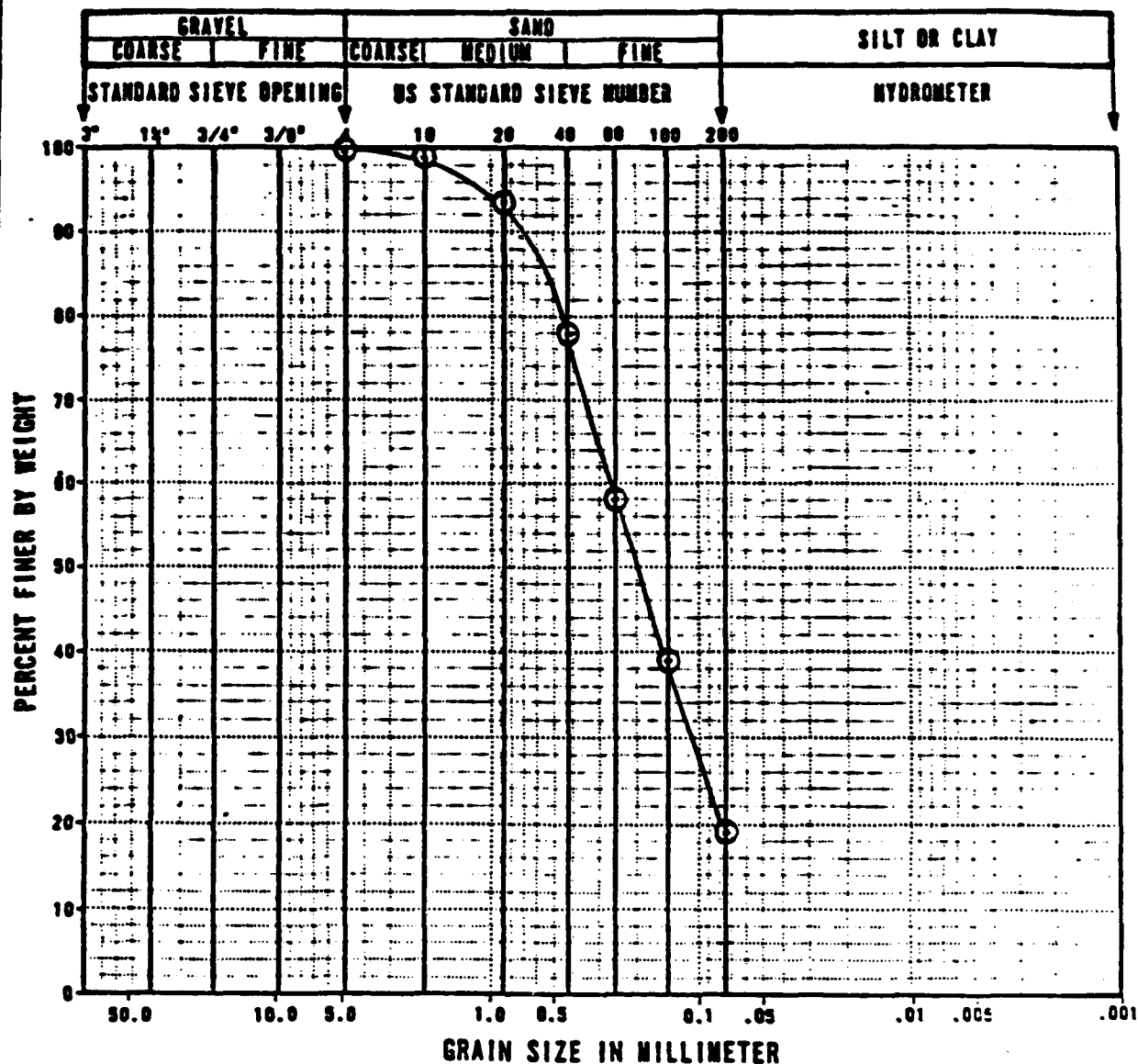
Drafted: 10/16/87

FIGURE CS-SP-5d

Grain Size Distribution Curve
Boring 9, 7.8-8.8 ft., Trench CS02,
Section I

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987a

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

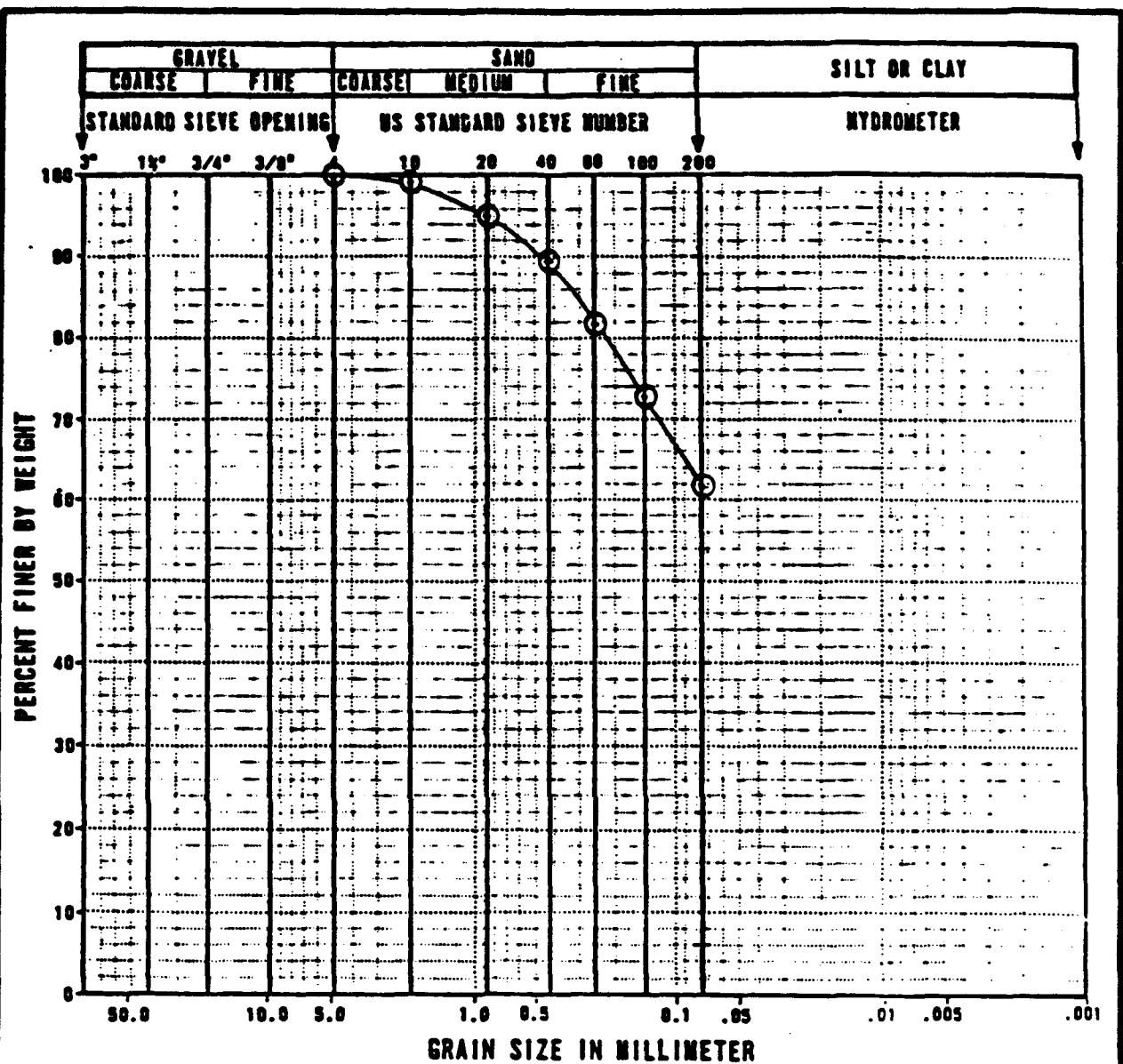
Drafted: 10/16/87

FIGURE CS-SP-5e

Grain Size Distribution Curve
Boring 9, 11.2-11.8 ft., Trench CS03,
Section 2

Rocky Mountain Arsenal, Task 10

Prepared by Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

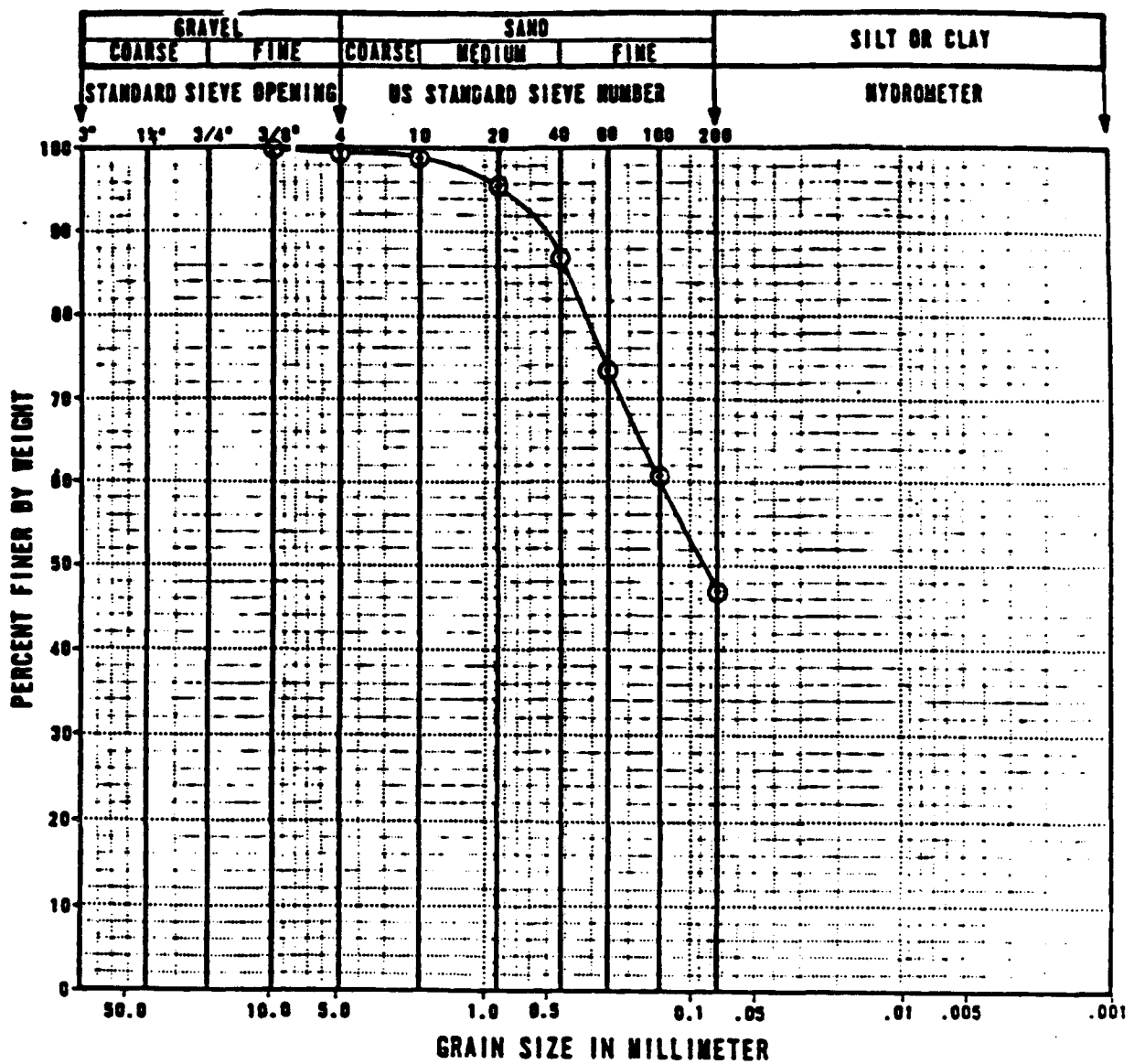
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 10/16/87

FIGURE CS-SP-5f

Grain Size Distribution Curve
Boring 10, 11.8-12.3 ft,
Trench CS03, Section 2
Rocky Mountain Arsenal, Task 10

Prepared by Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987a

Prepared for:

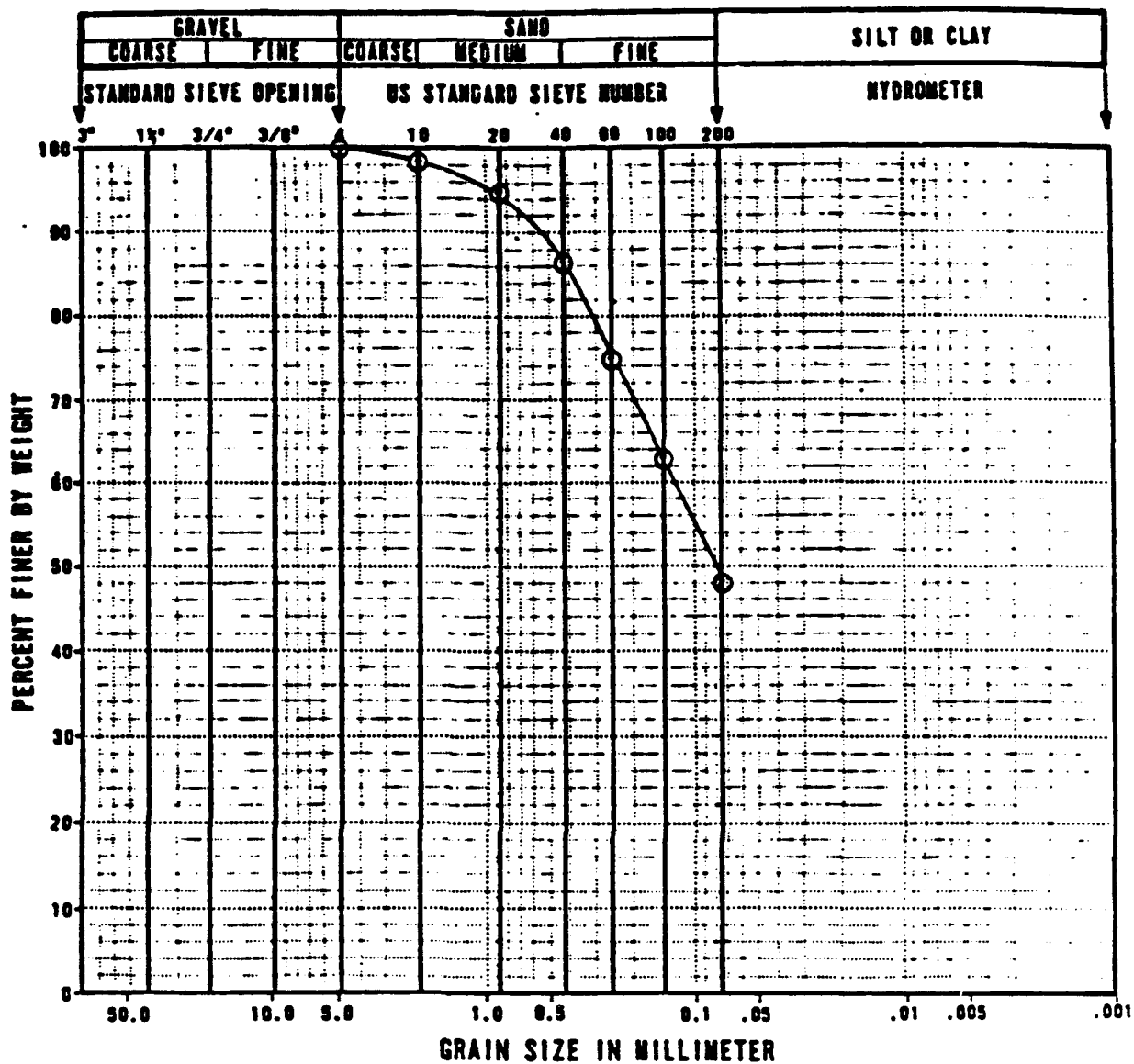
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 10/16/87

FIGURE CS-SP-5g

Grain Size Distribution Curve
Boring II, 10.8 - 11.5 ft.,
Trench CS03, Section 2
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

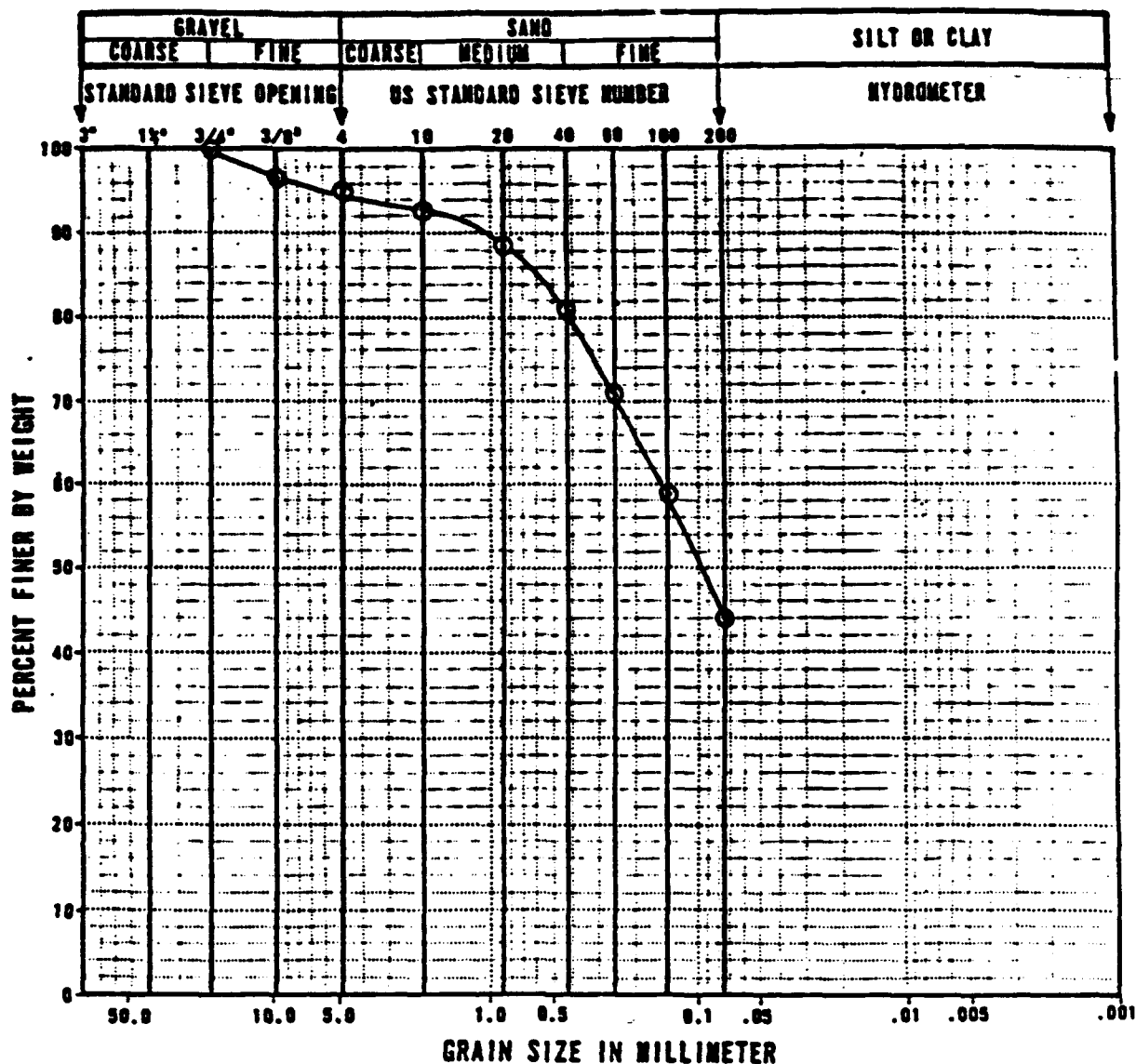
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground; Maryland

Drafted : 10/20/87

FIGURE CS-SP-5h

Grain Size Distribution Curve
Boring 12, 11.5 - 12.5 ft.,
Trench CS03, Section 2
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987 b

Prepared for:

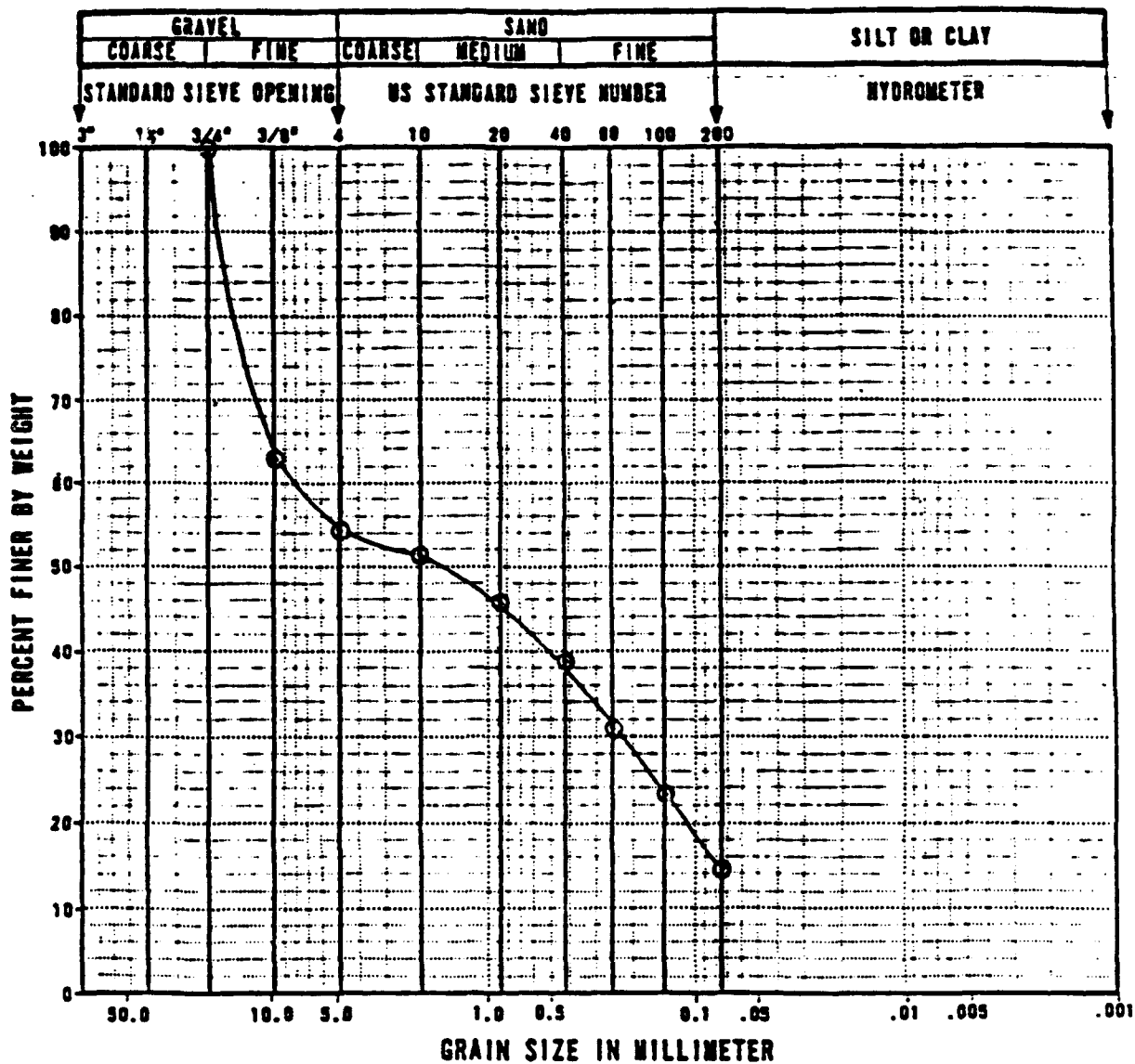
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 1/28/88

FIGURE CS-SP-51

Grain Size Distribution Curve
Physical Sample, 5.3-6.1 ft.,
Trench MKE 2, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987b

Prepared for:

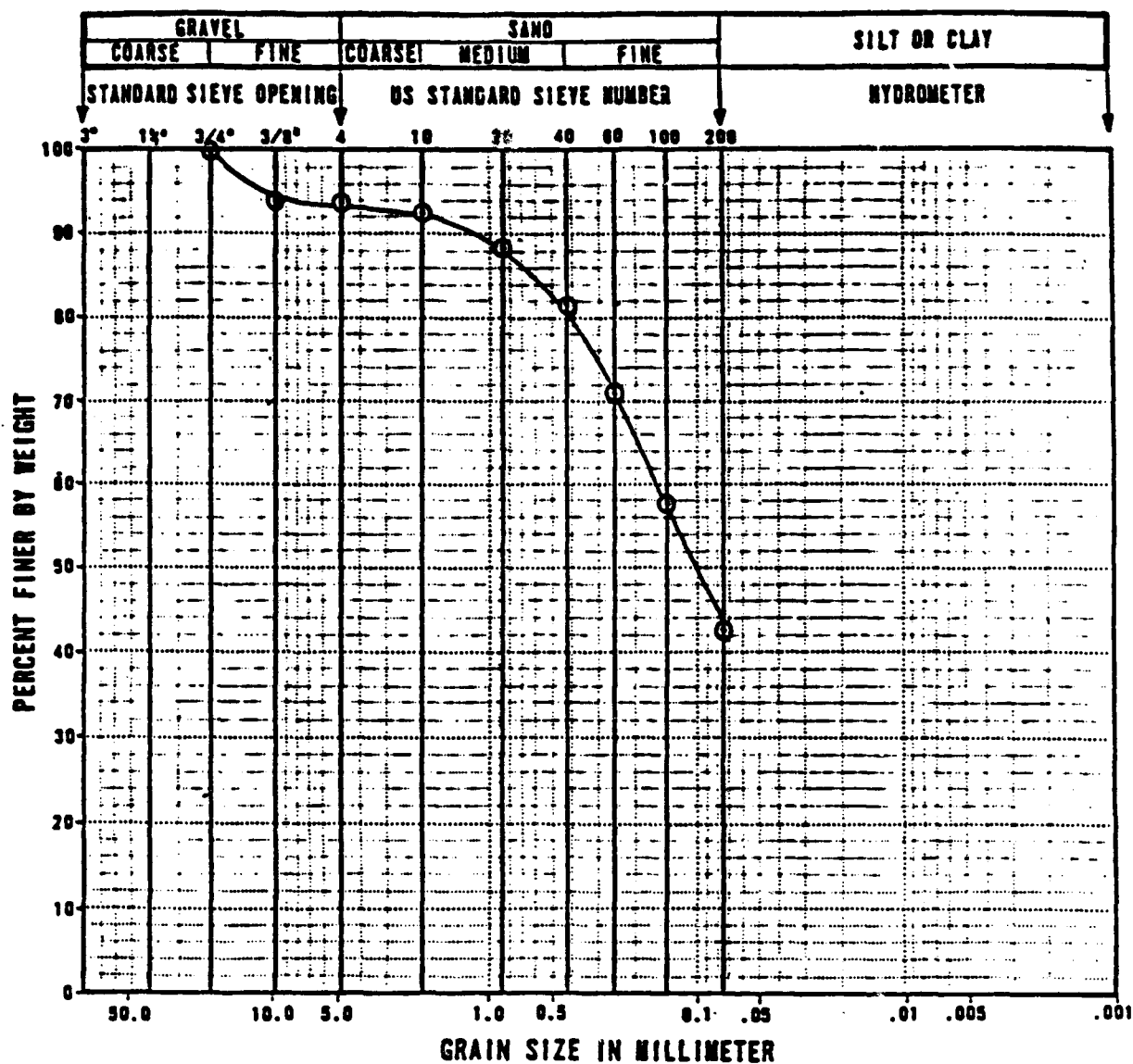
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 1/28/88

FIGURE CS-SP-5]

Grain Size Distribution Curve
Physical Sample, 8.5-9.3 ft.,
Trench MKE 3, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987b

Prepared for:

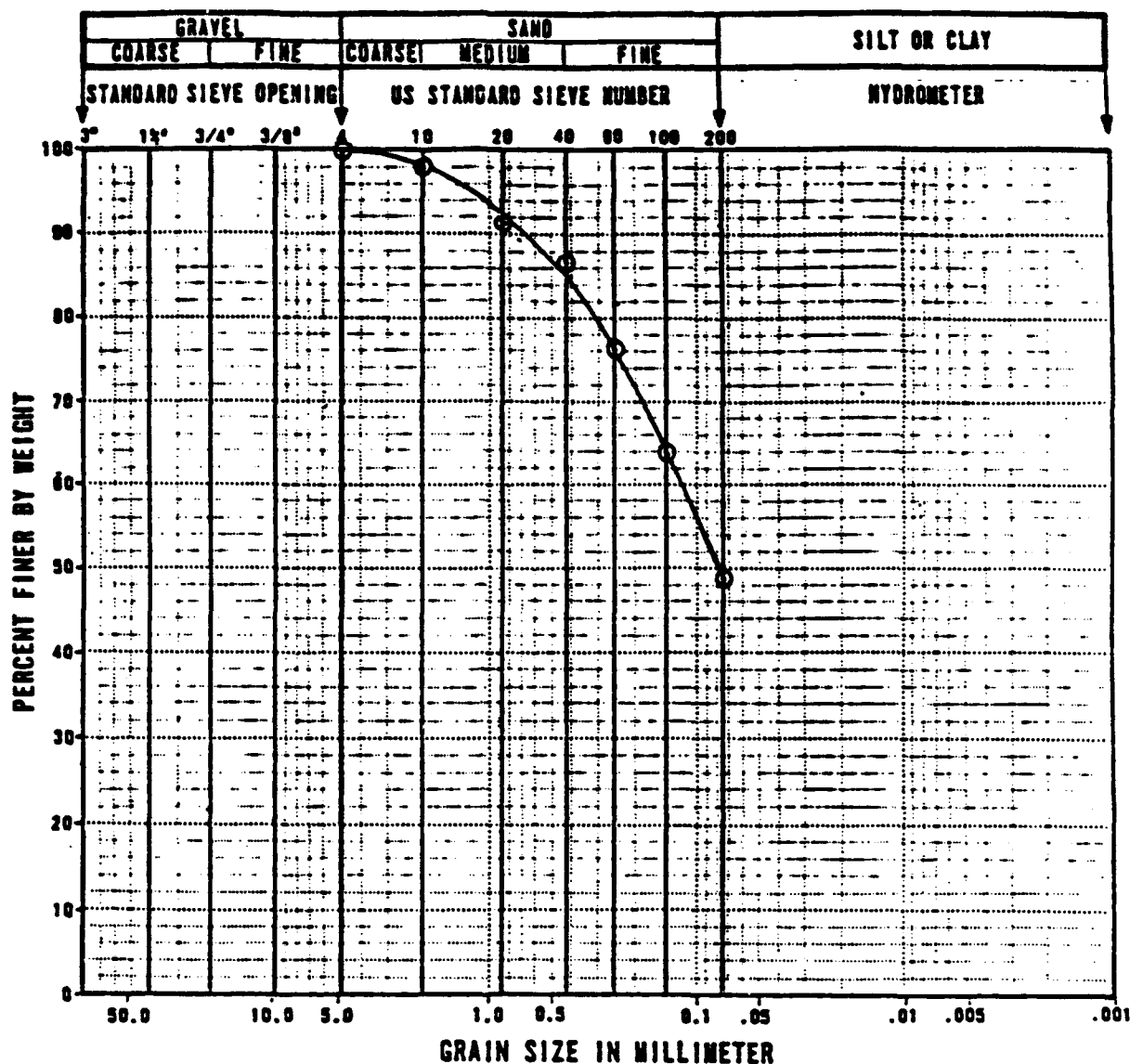
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 1/28/88

FIGURE CS-SP-5k

Grain Size Distribution Curve
Physical Sample, 7.0-8.0ft.
Trench MKE 4, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source: The Earth Technology Corporation, 1987b

Prepared for:

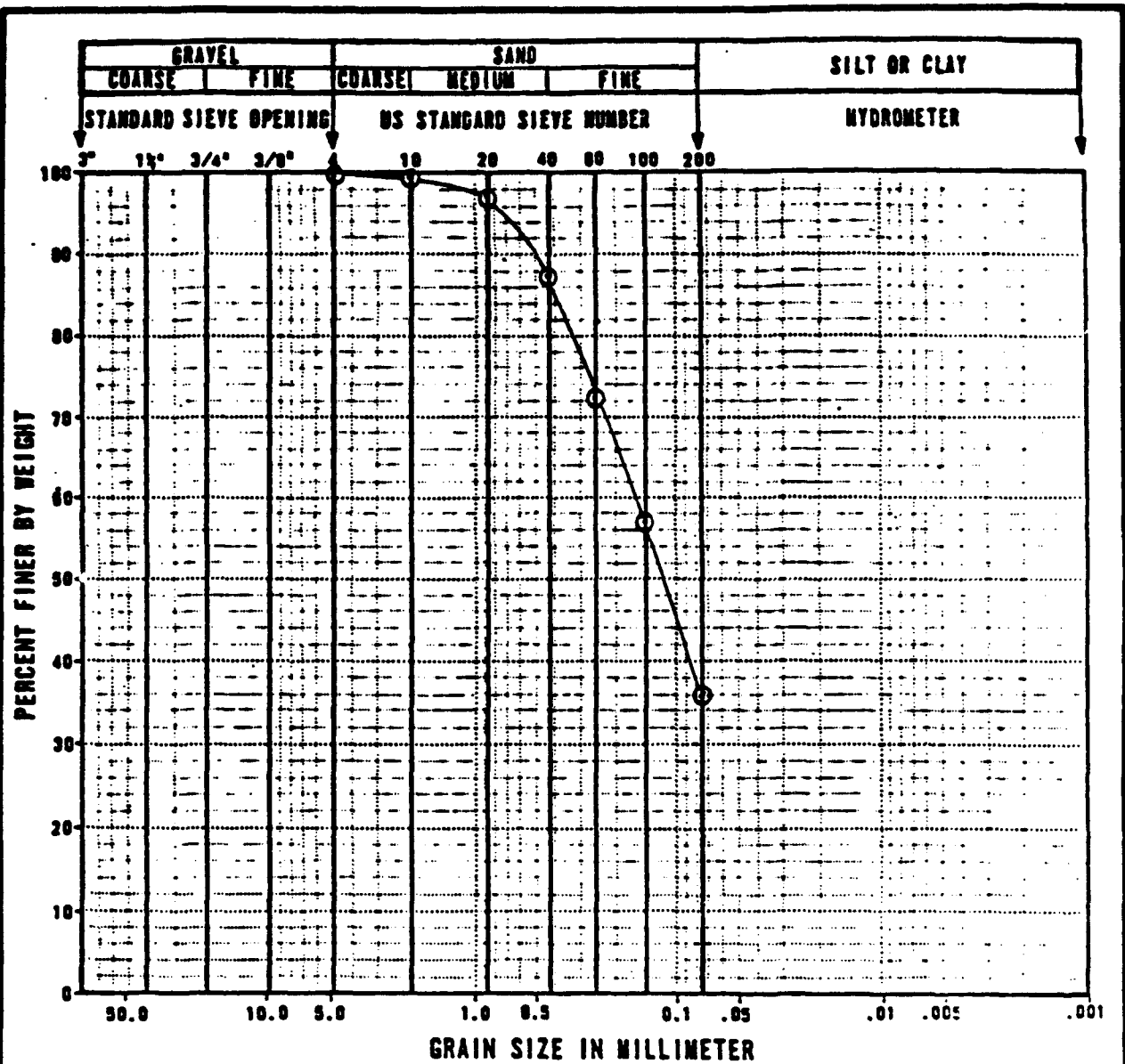
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 1/28/88

FIGURE CS-SP-51

Grain Size Distribution Curve
Physical Sample, 7.5-8.5 ft.,
Trench MKE 6, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

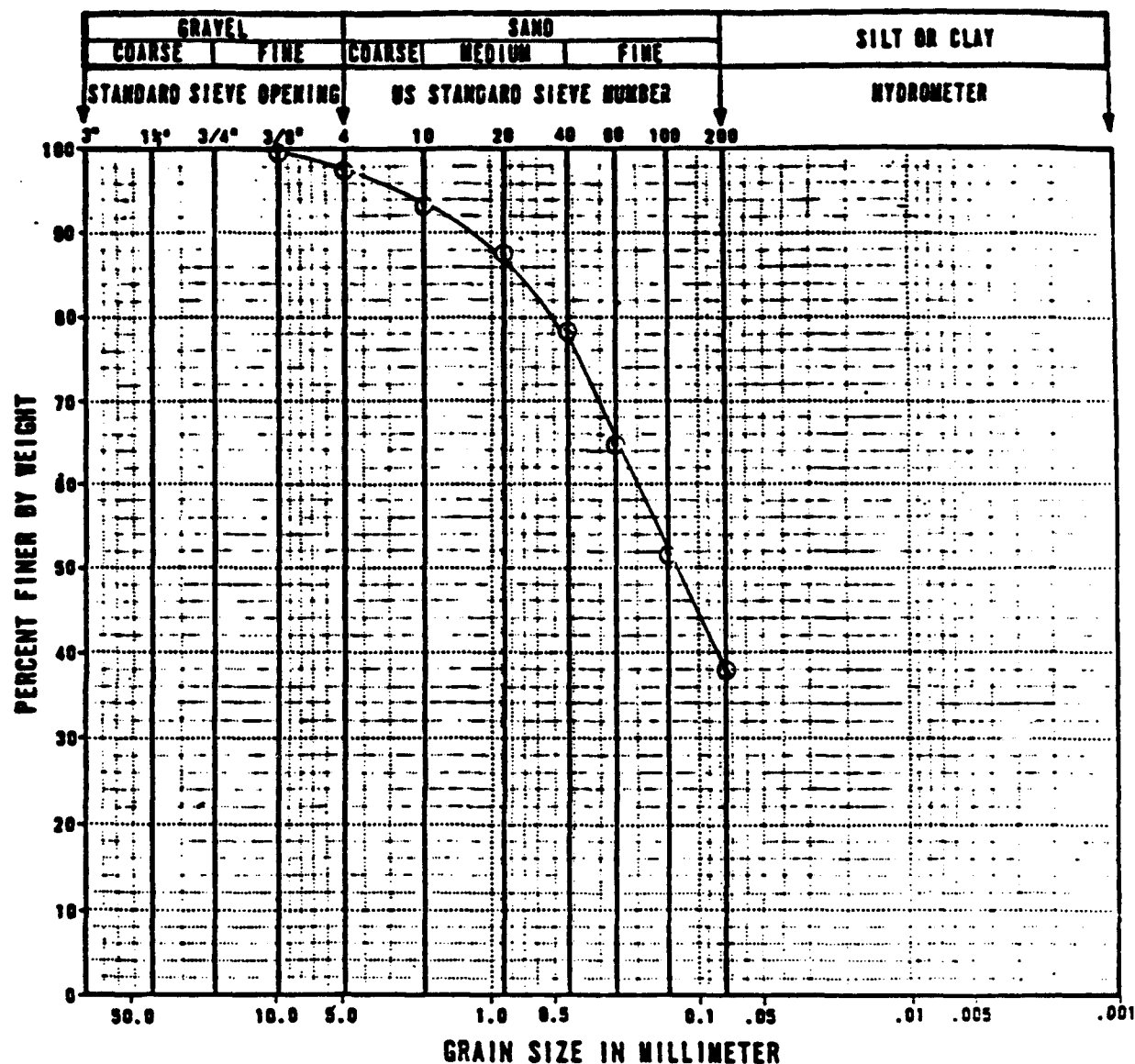
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 10/20/87

FIGURE CS-SP-5m

Grain Size Distribution Curve
Physical Sample, 5.5 - 6.3 ft.,
Trench MKE 7, Section 35
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

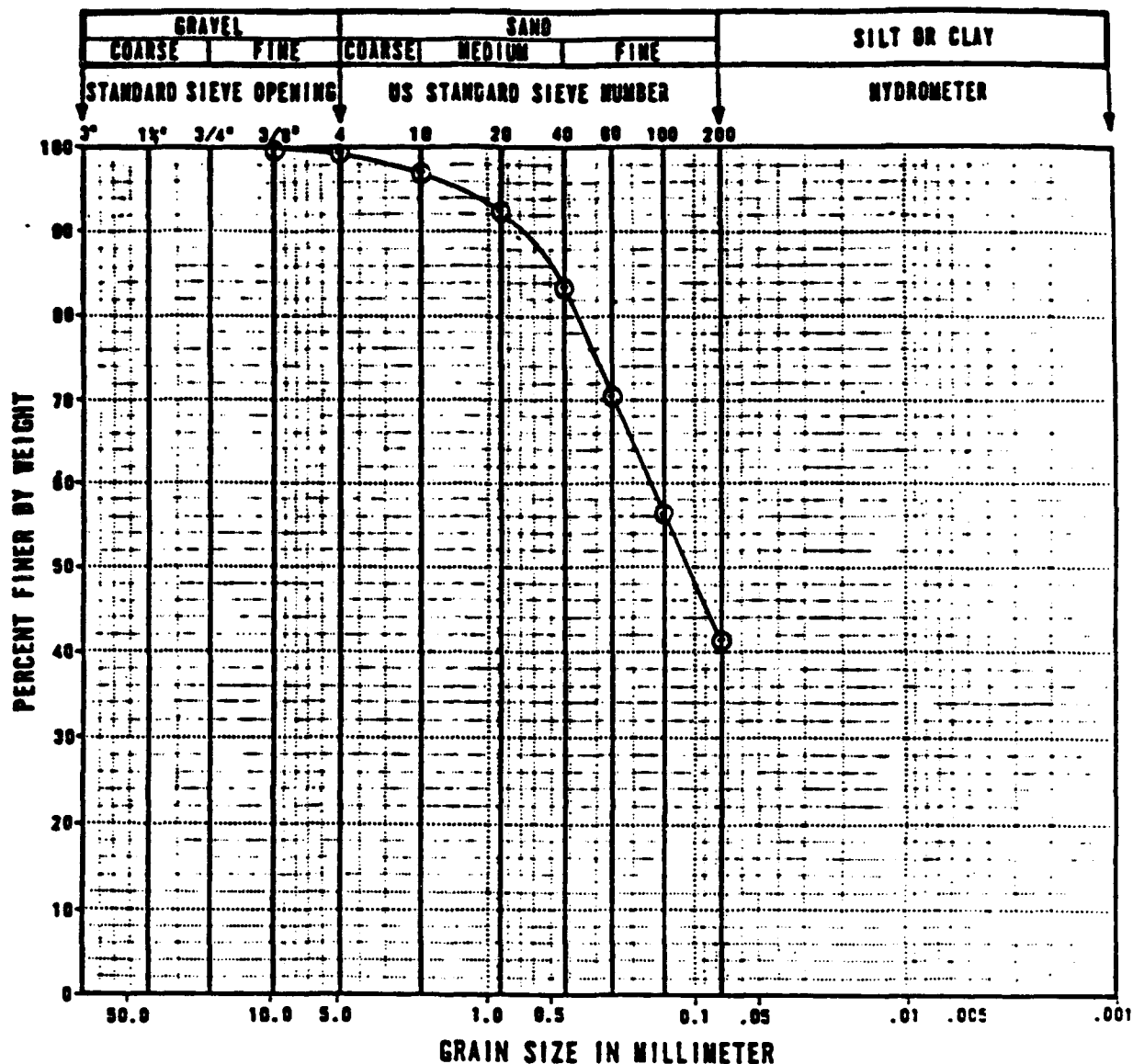
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 10/20/87

FIGURE CS-SP-5n

Grain Size Distribution Curve
Physical Sample, 3.4 - 4.2 ft.
Trench MKE 19, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

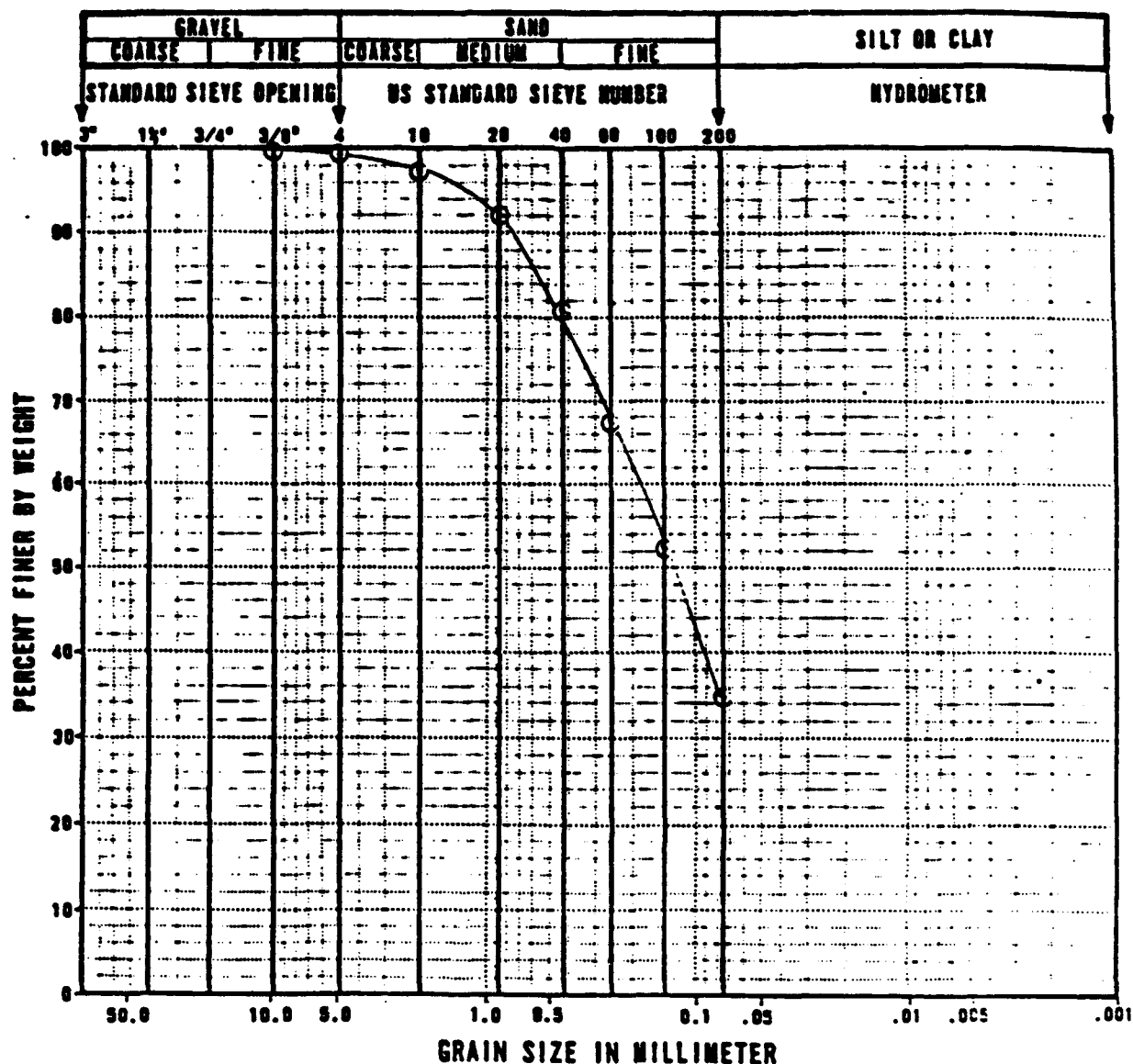
Program. Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground; Maryland

Drafted : 10/20/87

FIGURE CS-SP-5a

Grain Size Distribution Curve
Physical Sample, 3.9 - 4.5 ft.,
Trench MKE 20, Section I
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated



Source : The Earth Technology Corporation, 1987a

Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted : 10/20/87

FIGURE CS-SP-5p

Grain Size Distribution Curve
Physical Sample, 7.5 - 8.3 ft.,
Trench MKE 21, Section 2
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

6.9-7.9

W25

Benzene	20
BCHPD	20
CCl ₄	20
CHCl ₃	20
DSCP	400
ETC _{H₅}	6000/10000 *
13 DMB	100
CH ₂ Cl ₂	6
Xylene	40
TCLEE	40
Toluene	300
Aldrin	10000
PPDDT	70
Dieldrin	100
Cl ₂ CP	90
Isodrin	300
As	130
Cd	5
Cu	42
Hg	8.8
Zn	92
TDGCL	14
Cl ₂ GA	230

11.8-12.8

Benzene	1
BCHPD	8
CCl ₄	4
CHCl ₃	6
DSCP	2000/80 *
13 DMB	1
CH ₂ Cl ₂	9
TCLEE	5
Toluene	7
Aldrin	200
PPDDT	5
Cu	43
Hg	0.065
Zn	85

16.2-17.2

Cu	38
----	----

21.2-22.1

Cu	37
----	----

26.2-27.2

CHCl ₃	1
-------------------	---

Cu	26
----	----

Zn	110
----	-----

3.2-4.2

CH ₂ Cl ₂	1
---------------------------------	---

Aldrin	2
--------	---

8.2-9.2

CH ₂ Cl ₂	1
---------------------------------	---

TCLEE	0.6
-------	-----

12.2-13.2

CH ₂ Cl ₂	1
---------------------------------	---

Zn	82
----	----

17.2-18.2

Cu	20
----	----

Zn	72
----	----

22.2-23.2

Zn	73
----	----

6-1

Cu	47
----	----

Pb	36
----	----

Zn	85
----	----

TCLEE	0.6
-------	-----

Cu	42
----	----

Zn	110
----	-----

TCLEE	0.5
-------	-----

CCl ₄	0.6
------------------	-----

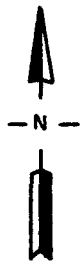
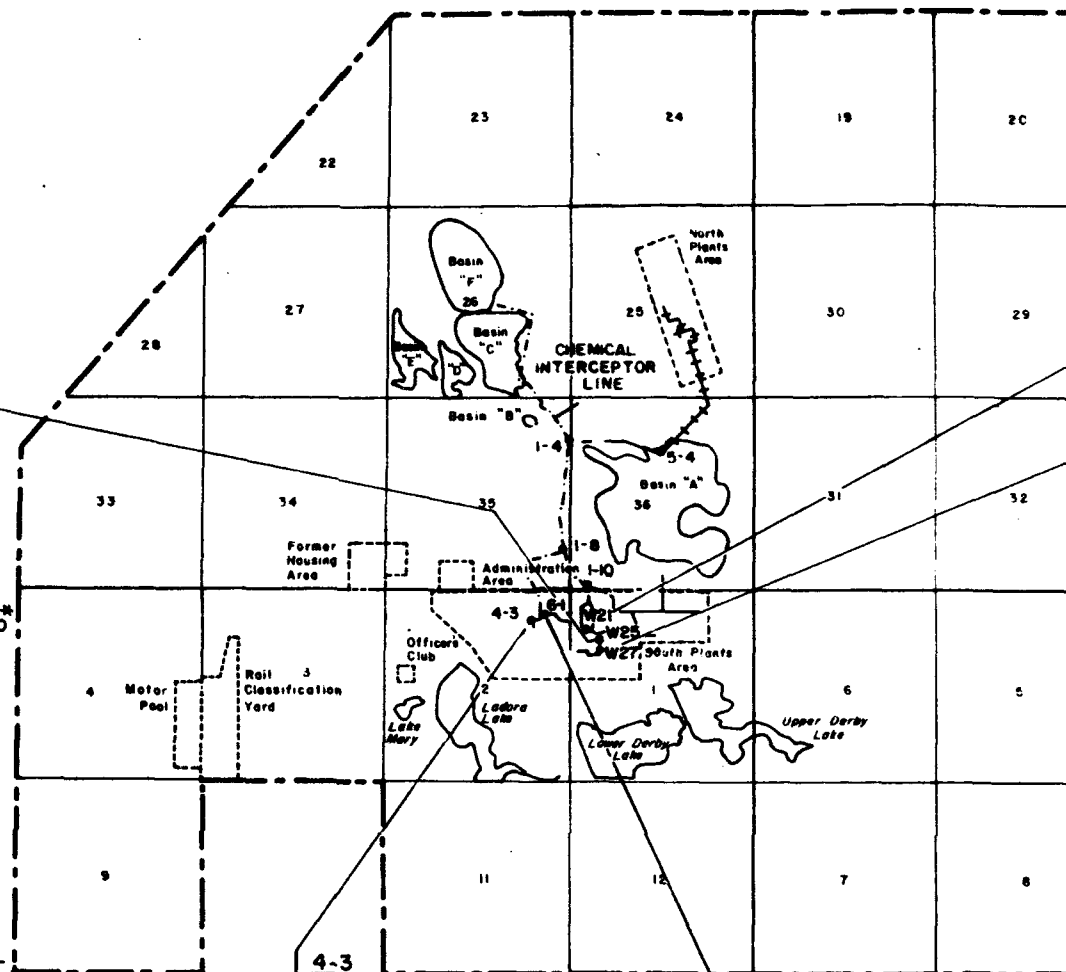
TCLEE	1
-------	---

Cu	46
----	----

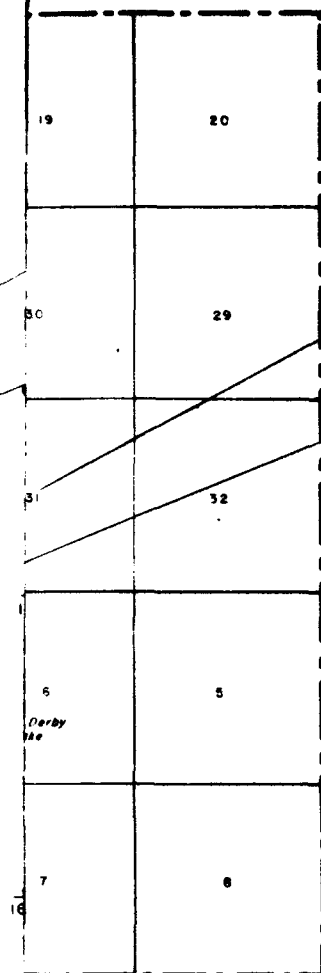
Zn	100
----	-----

Cu	30
----	----

Zn	80
----	----



0 5000
FEET



		8.0-9.0	<u>W21</u>
			BCHPD 2
			CCl ₄ 5
			ClC ₆ H ₅ 5
			CHCl ₃ 20
			DBCP 800/BIL*
			13DMB 20
			Xylene 20
			TCLEE 9
			Toluene 20
			Aldrin 50
			Isodrin 1
			As 300
			Cd 10
			Cr 45
			Cu 36
			Pb 25
			Zn 98
6.5-7.5	<u>W27</u>	12.0-13.0	BCHPD 0.7
	BCHPD 2		CCl ₄ 0.4
	DBCP BIL/10*		CHCl ₃ 5
	TCLEE 4		DBCP 70/BIL*
	Aldrin 100		13DMB 1
	PPDOE 2		CH ₂ Cl ₂ 3
	PPDDT 30		MIBK 5
	Dieldrin 90		TCLEE 0.7
	As 15		Toluene 3
	Cu 41		As 46
	Hg 2		Cu 34
	Pb 49		Zn 85
	Zn 130		TDGCL 3.2
11.5-12.5	Benzene 1	17.0-18.0	BCHPD 2
	BCHPD 30		CCl ₄ 0.7
	CCl ₄ 20		ClC ₆ H ₅ 2
	CHCl ₃ 5		CHCl ₃ 1
	DBCP 200/50*		DBCP 6/0.5*
	TCLEE 10		TCLEE 0.9
	Toluene 50		Aldrin 100
	Aldrin 90		Dieldrin 0.8
	CPMSO ₂ 0.3		Isodrin 10
	PPDDT 2		Parathion 30
	Dieldrin 2		Supona 3
	Cl ₆ CP 0.8		As 12
	Isodrin 6		Pb 25
	Supona 2		Zn 99
	Cu 36	22.0-23.0	CHCl ₃ 0.8
	Hg 0.061		Cu 40
	Zn 100		Zn 89
16.2-17.2	BCHPD 4	27.0-28.0	Benzene 1
	CCl ₄ 10		CHCl ₃ 7
	CHCl ₃ 10		DBCP BIL/0.4*
	DBCP 400/100*		Toluene 0.5
	CH ₂ Cl ₂ 2		Aldrin 10
	TCLEE 0.9		Dieldrin 1
	Toluene 10		Supona 4
	Aldrin 100		Cu 42
	PPDDT 0.8		Zn 99
	Dieldrin 1		
	Cl ₆ CP 0.7		
	Isodrin 5		
	Supona 0.7		
	Cr 72		
	Cu 38		
	Zn 84		
21.2-22.2	BCHPD 1		
	CCl ₄ 2		
	CHCl ₃ 7		
	DBCP 30/9*		
	CH ₂ Cl ₂ 2		
	Toluene 1		
	Cu 41		
	Zn 86		
26.2-27.2	BCHPD 2		
	CCl ₄ 4		
	CHCl ₃ 10		
	CH ₂ Cl ₂ 3		
	Toluene 3		
	Aldrin 7		
	Cu 39		
	Zn 93		

- Legend**
- Chemical Sewer
 - Chemical Sewer Removed by the Army in 1982
 - Steel Chemical Sewer Line
 - W21 Manhole with Number
- Analyte**
- Sampling Interval (ft) below ground surface
- | | | | |
|---------|-------|---|--------------|
| 6.5-7.5 | BCHPD | 2 | Level (ug/g) |
|---------|-------|---|--------------|
- IIITCE — 1,1,1 Trichloroethane
 - II2 TCE — 1,1,2 Trichloroethane
 - BCHPD — Bicycloheptadiene
 - CCl₄ — Carbon tetrachloride
 - Cl₆H₆ — Chlorobenzene
 - CHCl₃ — Chloroform
 - DBCP — Dibromochloropropane
 - ETC₆H₆ — Ethylbenzene
 - 13DMB — m-Xylene
 - CH₂Cl₂ — Methylene chloride
 - MIBK — Methylisobutyl ketone
 - Xylene — o- and p- Xylene
 - TCLEE — Tetrachloroethane
 - TRCLE — Trichloroethylene
 - CPMSO₂ — Chlorophenylmethyl sulfone
 - DBCP — Dibromochloropropane (VO/SVO)
 - PPDDE — Dichlorodiphenylethane
 - PPDDT — Dichlorodiphenyltrichloroethane
 - Cl₆CP — Hexachlorocyclopentadiene
 - As — Arsenic
 - Hg — Mercury
 - TDGCL — Thiodiglycol
 - Cl₂CA — Chloroacetic acid
 - BIL — Below Indicator Level

* VO analysis / SVO analysis

Prepared for :

Program Manager's Office for

Rocky Mountain Arsenal Cleanup

Aberdeen Proving Ground, Maryland

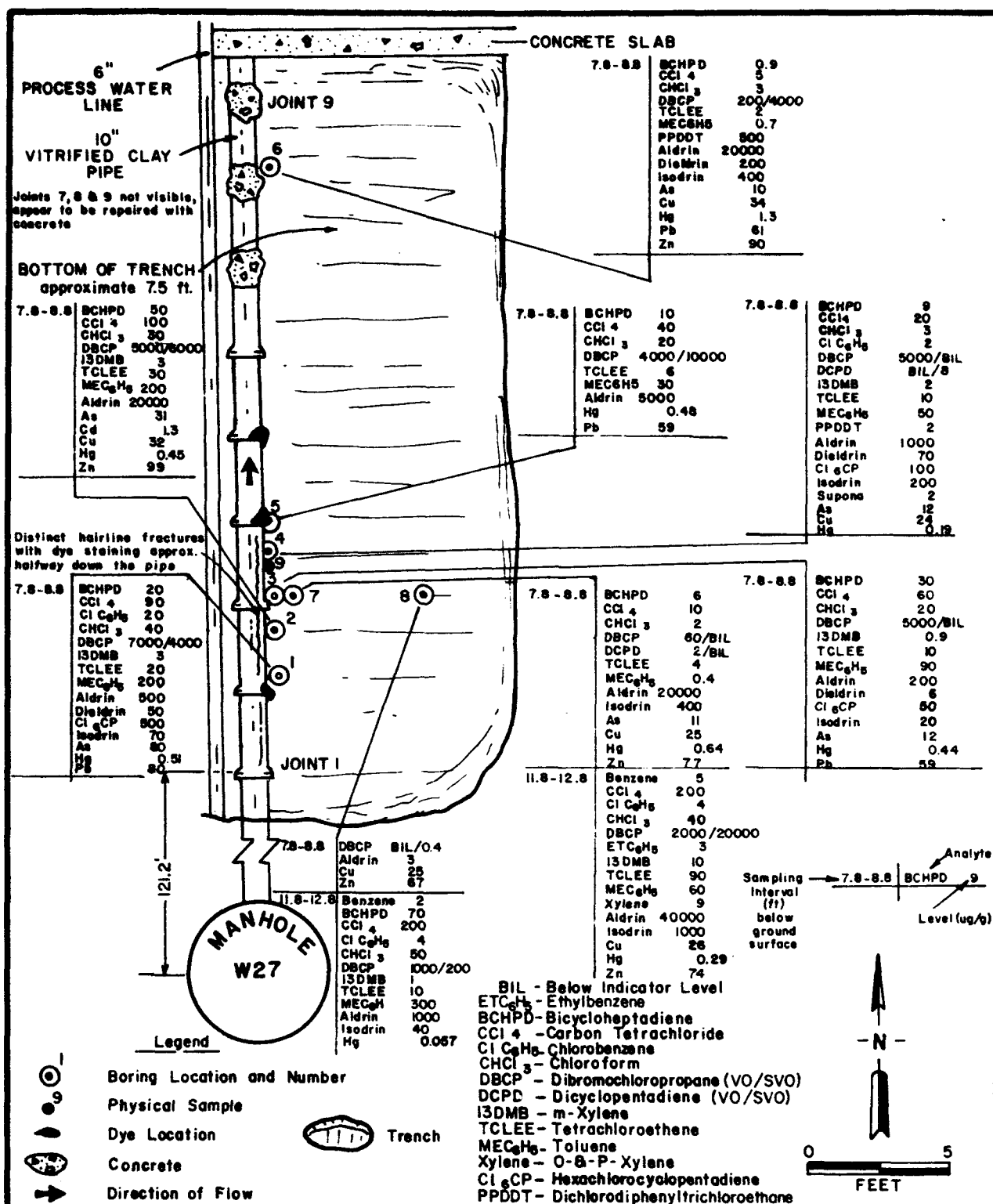
Drafted : 12/10/87

FIGURE CS-SP-6a

Analytes Detected Within or Above Indicator Levels for Manholes W21, W25, W27, 4-3, and 6-1, Sec. I and 2

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Inc.



Prepared for:

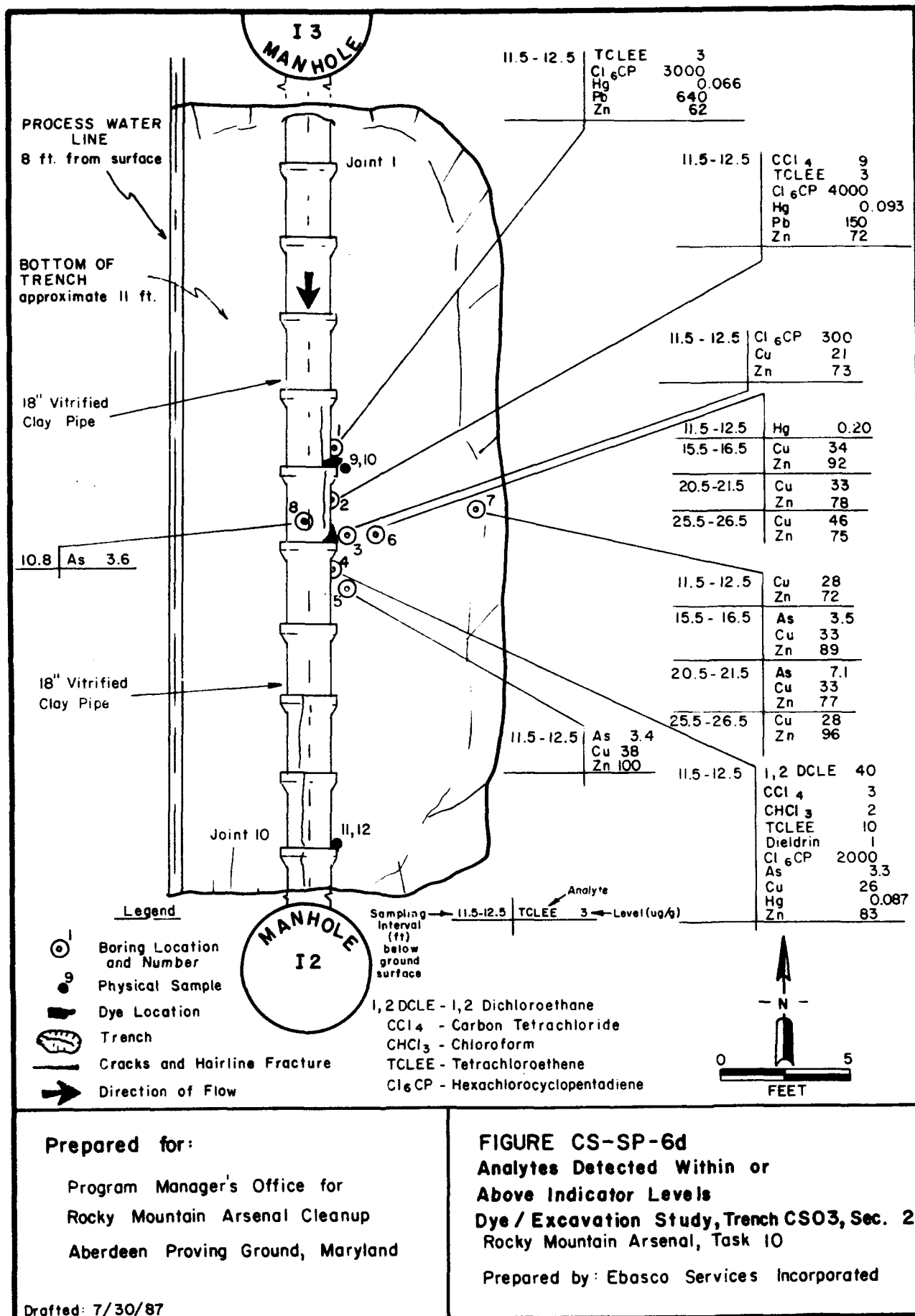
Program Manager's Office for
 Rocky Mountain Arsenal Cleanup
 Aberdeen Proving Ground, Maryland

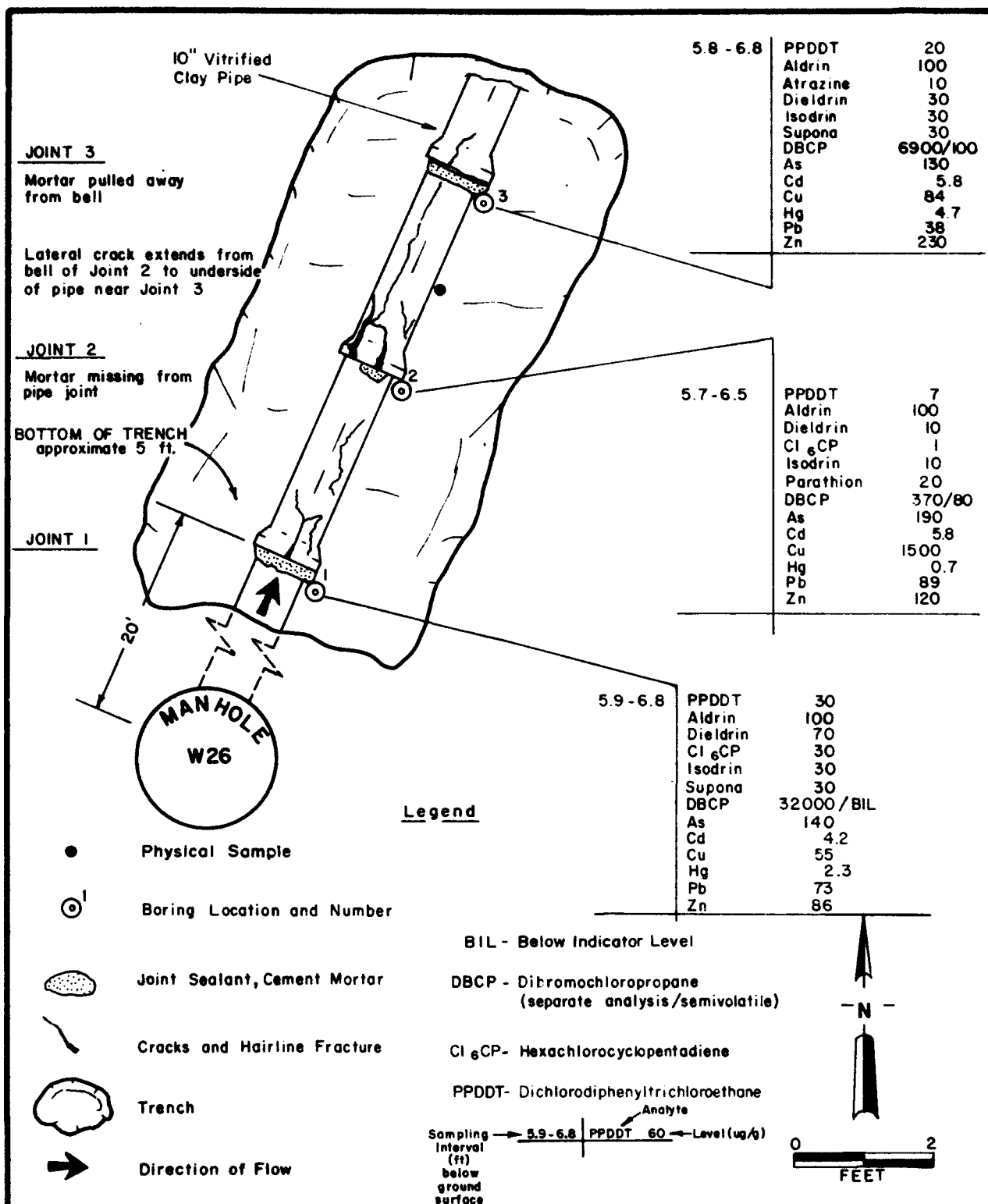
Drafted: 7/27/87

FIGURE CS-SP-6c

Analytes Detected Within or
 Above Indicator Levels
 Dye/Excavation Study, Trench CS02, Sec. I
 Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated





Prepared for:

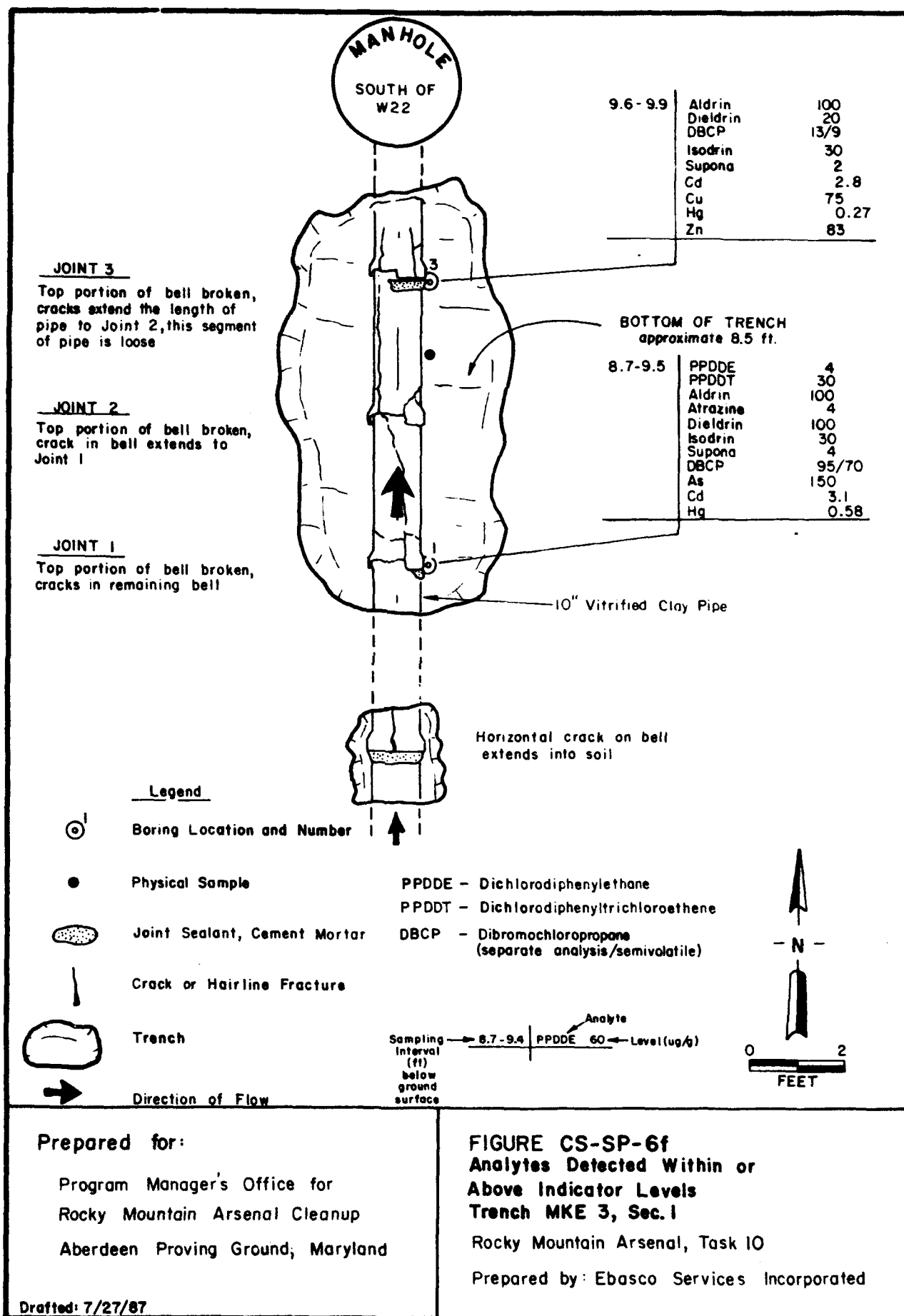
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

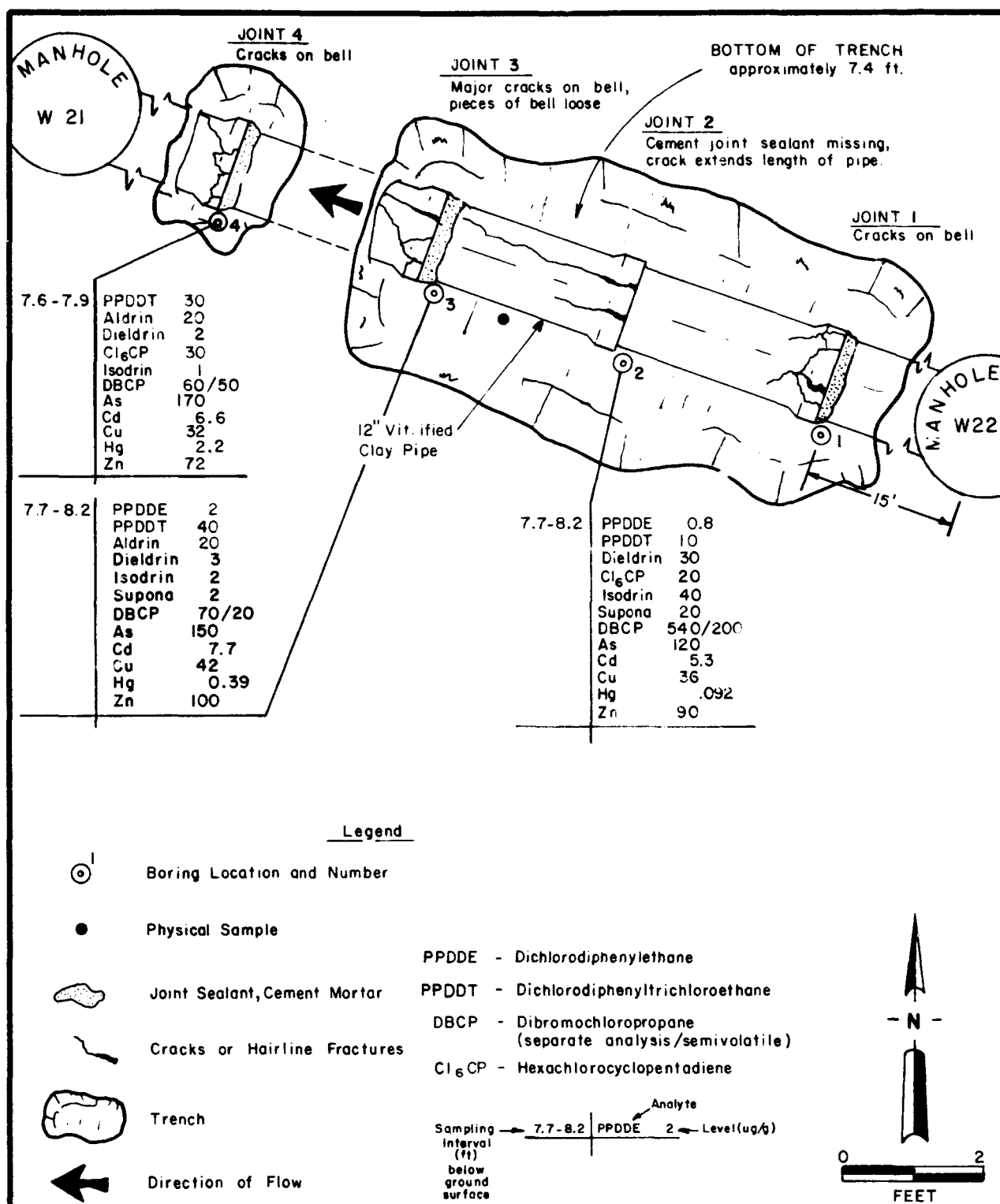
Drafted: 7/28/87

FIGURE CS-SP-6e
Analytes Detected Within or
Above Indicator Levels
Trench MKE 2, Sec. I

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated





Prepared for:

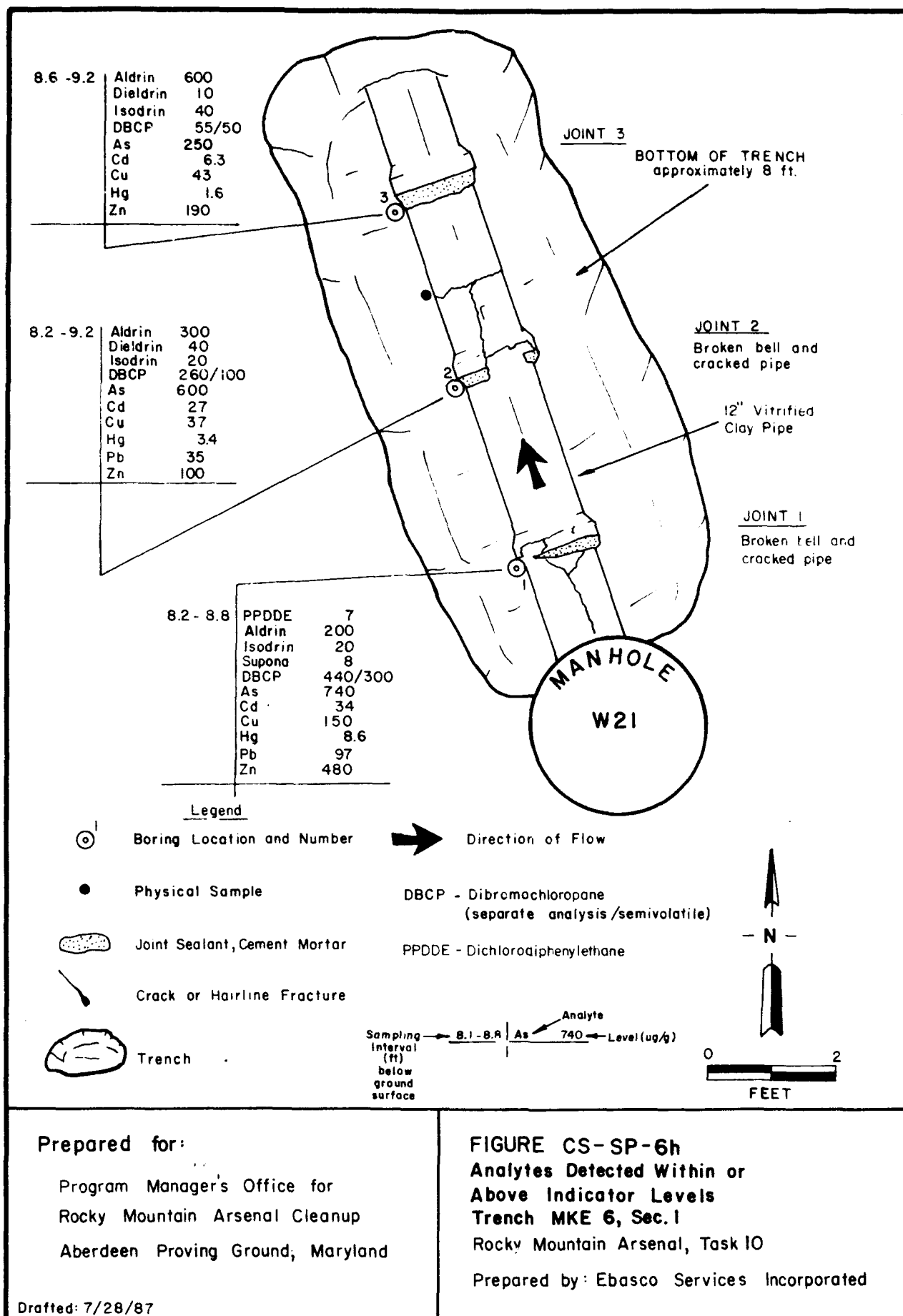
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 8/4/87

FIGURE CS-SP-6g

**Analytes Detected Within or
Above Indicator Levels
Trench MKE 4, Sec. 1
Rocky Mountain Arsenal, Task 10**

Prepared by: Ebasco Services Incorporated



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

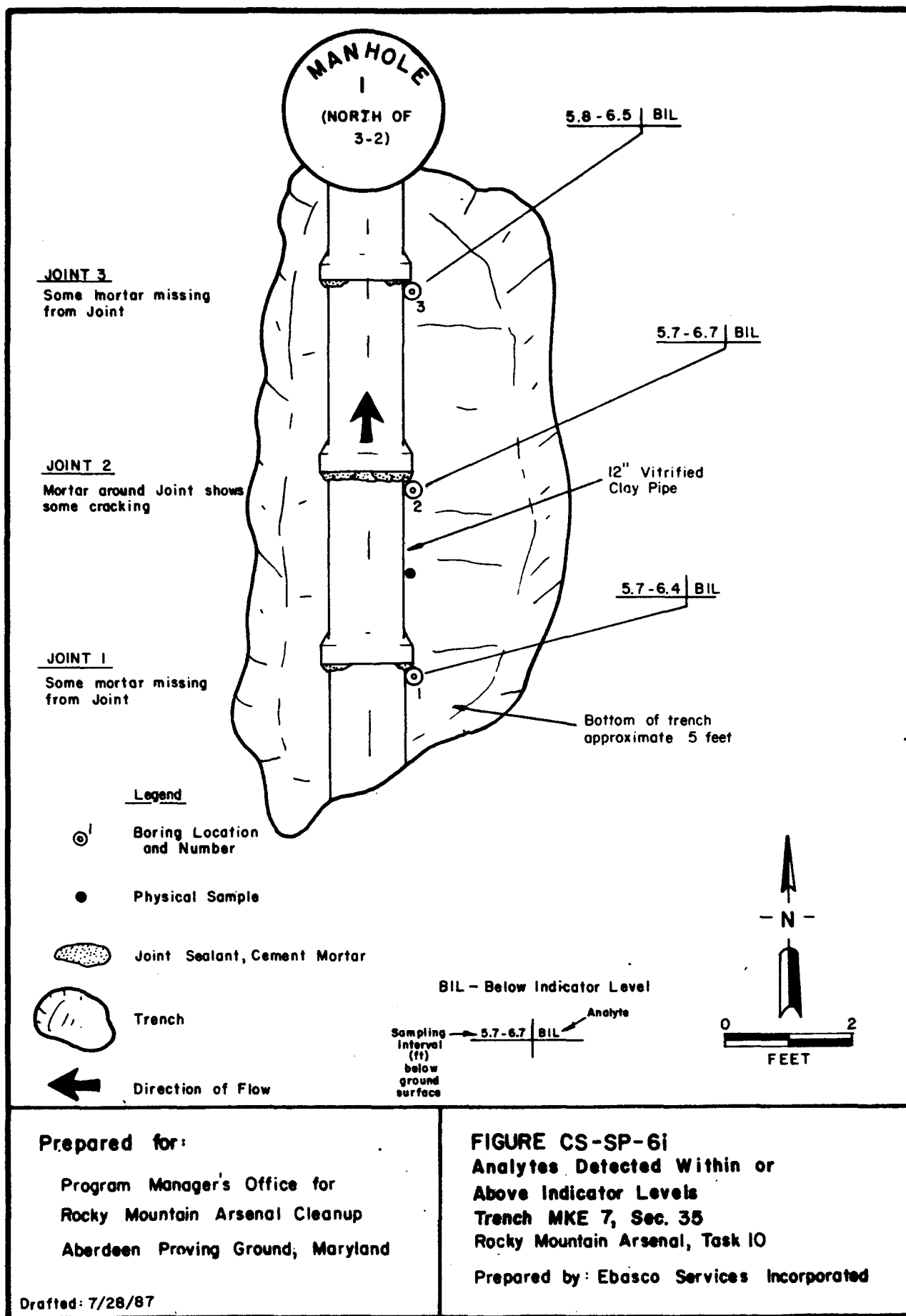
Drafted: 7/28/87

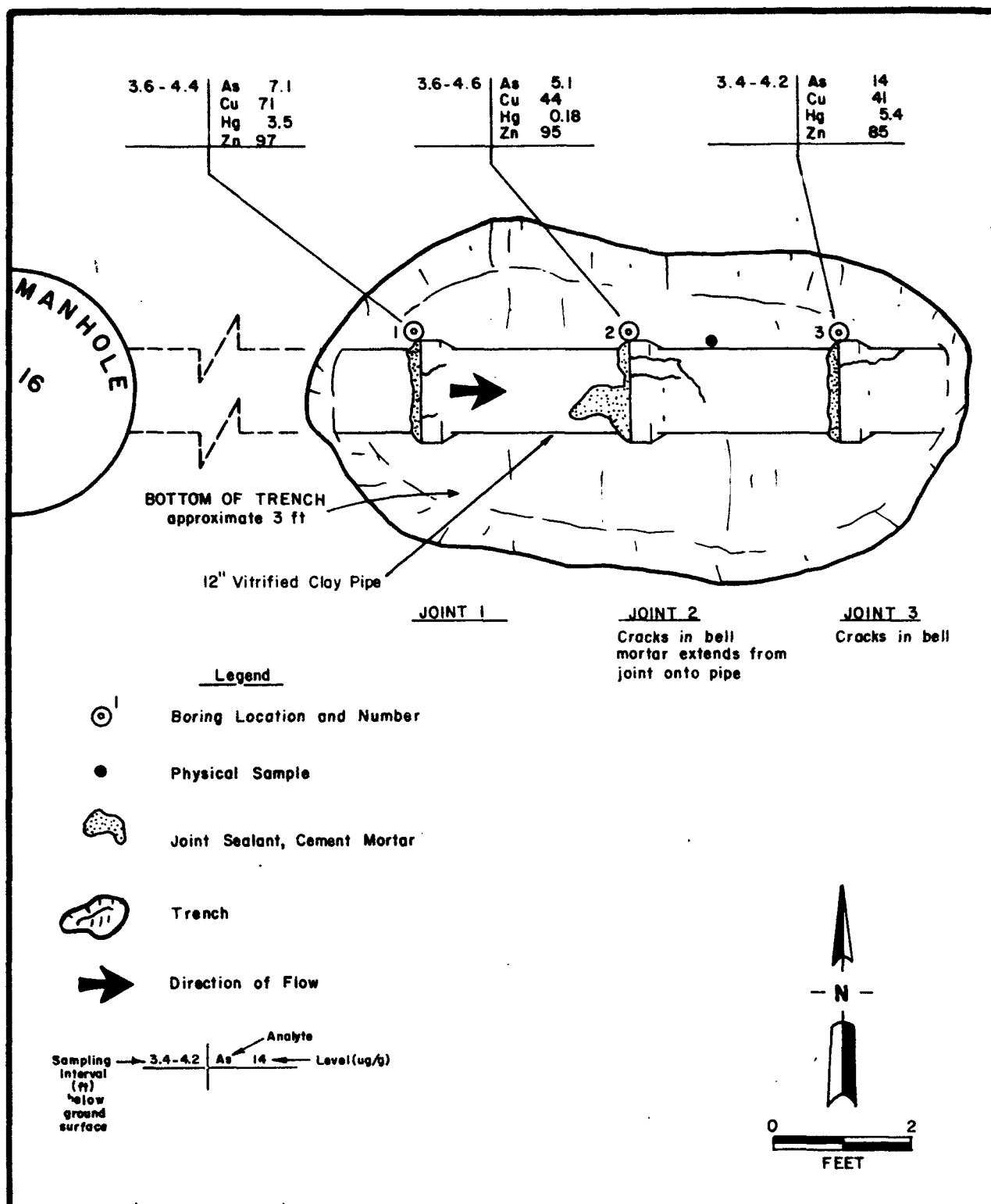
FIGURE CS-SP-6h

**Analytes Detected Within or
Above Indicator Levels
Trench MKE 6, Sec. I**

Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated





Prepared for:

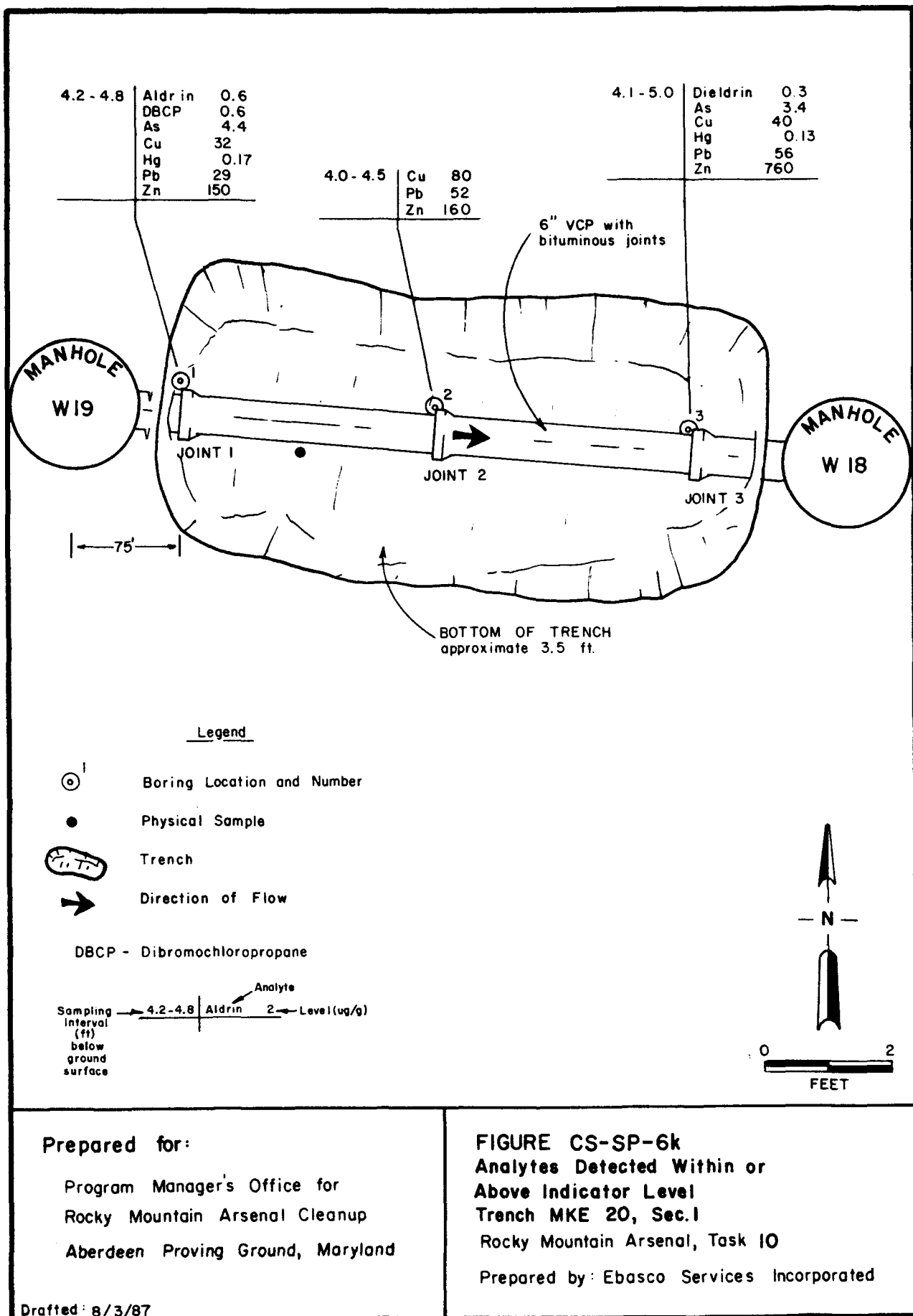
Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

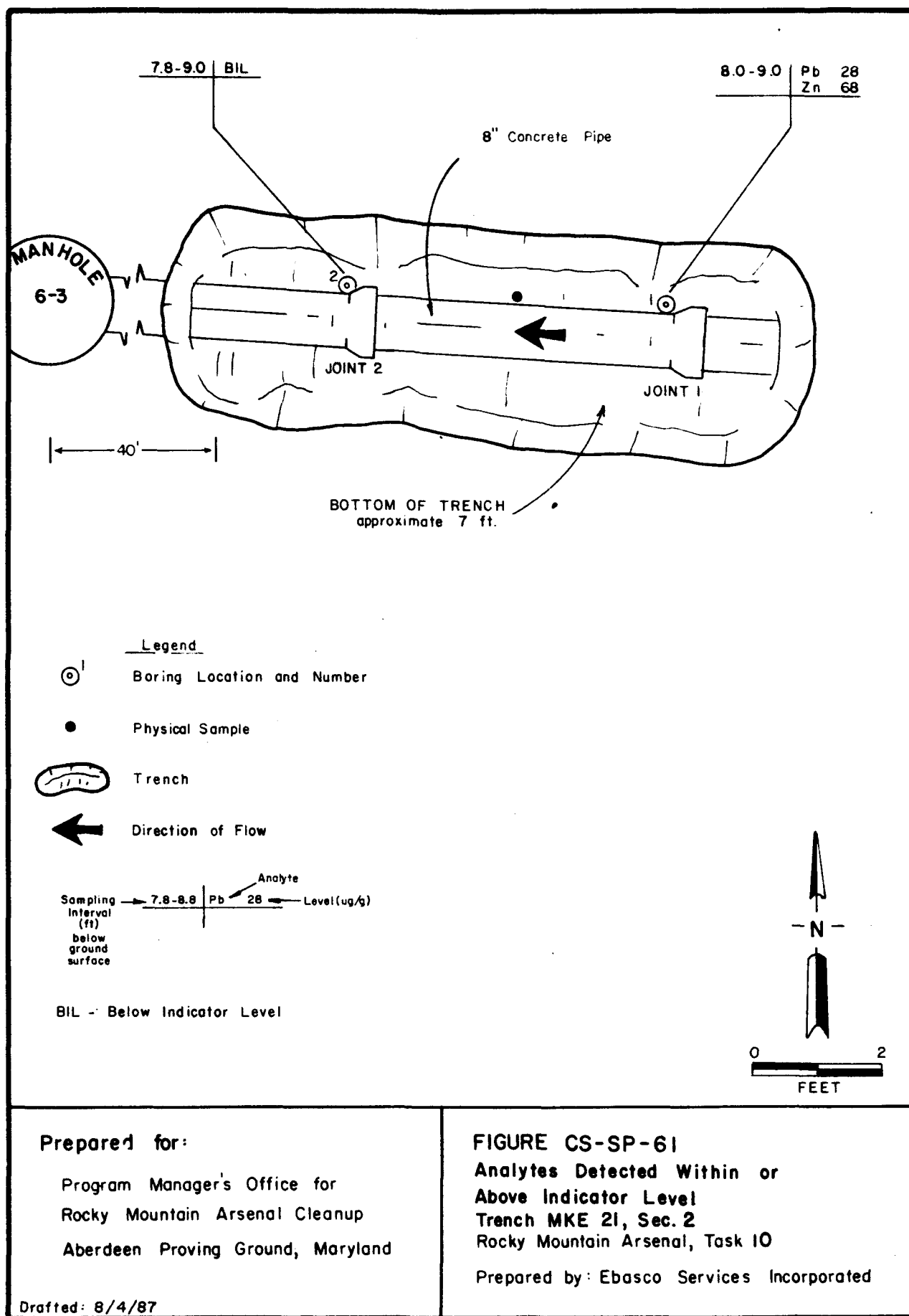
Drafted: 7/28/87

FIGURE CS-SP-6j

**Analytes Detected Within or
Above Indicator Levels
Trench MKE 19, Sec. I
Rocky Mountain Arsenal, Task 10**

Prepared by: Ebasco Services Incorporated





Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

Drafted: 8/4/87

FIGURE CS-SP-61

Analytes Detected Within or
Above Indicator Level
Trench MKE 21, Sec. 2
Rocky Mountain Arsenal, Task 10

Prepared by: Ebasco Services Incorporated

Indicator levels and ranges were established to assess the significance of metal and organic analytical values. The indicator levels are the method detection limits for organic compounds. The indicator ranges for metals reflect the concentrations expected to occur naturally in RMA alluvial soils. Selection of these ranges is discussed in the Introduction to the Contamination Assessment Reports (ESE, 1986b).

In addition, numerous compounds were detected by GC/MS that were not included in the target compound list and that were not conclusively identified. Table CS-SP-11 lists the boring number, sample interval depth, relative retention time (shown as "unknown number" on the table), concentration, sample number, lot, and best-fit identification for these nontarget compounds. It should be noted that an individual compound may have more than one retention time, and also that a particular retention time may be assigned to more than one compound. Therefore, Table CS-SP-11 provides only a general indication of additional compounds that may be present.

Described below are the levels and distribution of target and nontarget analytes detected at each location investigated along the sewer line. These locations are identified on Plate CS-SP-1.

Manhole W21

In Manhole W21 (Figure CS-SP-6a), 18 volatile and semivolatile compounds and all of the metals except mercury were above indicator level in at least one sample. In general, concentrations of volatile compounds and several metals decrease with depth. The highest concentrations of semivolatile compounds were detected in the 17.0 to 18.0 ft interval.

Volatile compounds detected include: benzene (1 ug/g), bicycloheptadiene (0.7-2 ug/g), carbon tetrachloride (0.4-5 ug/g), chloroform (0.8-20 ug/g), chlorobenzene (2 and 5 ug/g), dibromochloropropane (6-800 ug/g), m-xylene (1 and 20 ug/g), methylene chloride (3 ug/g), methylisobutyl ketone (5 ug/g), o- and p-xylene (20 ug/g), tetrachloroethylene (0.7-9 ug/g), and toluene (0.5-20 ug/g). The following semivolatile compounds were detected: aldrin (10-100 ug/g), dibromochloropropane (0.4 and 0.5 ug/g), dieldrin (0.8 and 1 ug/g), isodrin (1 and 10 ug/g), parathion (30 ug/g), and supona (3 and 4 ug/g).

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 1 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
W21	8.0-9.0	102	20	002	BVO	3,3 dichloro-1-propene	A
		136	20	002	BVO	tricyclo(2.2.1.0 ^{2,6}) heptan-3-ol	
		537	0.4	004	BVM	halogenated propane	
		549	8	004	BVM		
		553	0.5	004	BVM	butenedioic acid, bis(2-methyl-propyl) ester	A
		579	0.4	004	BVM		D
		583	0.6	004	BVM		A
		607	1	004	BVM		A
		609	0.5	004	BVM		A
		635	0.4	004	BVM	branched hydrocarbon GT C-25	
	12.0-13.0			003	BVO	hexadecanoic acid	K
		609	0.7	005	BVM	nonanedioic acid, dibutyl ester	D
		615	1	005	BVM	isomer of octadecene (E)	D
		636	0.4	005	BVM		
				006	BVO	1,1,2,3,4,4-hexachloro-1,3-butadiene	K
	17.0-18.0	562	3	006	BVM	2-butenedioic acid, bis(1-methylpropyl) ester	D
		579	0.5	006	BVM	hexachloro bridged polycyclic hydrocarbon	
		601	3	006	BVM		
		607	0.7	006	BVM	unknown cyclic hydrocarbon	A
		608	0.4	006	BVM	dichlorinated organo phosphoric acid	A
		613	0.7	006	BVM	bridged polycyclic hydrocarbon	
		618	1	006	BVM	hexachloro bridged polycyclic hydrocarbon	
		627	1	006	BVM		
		635	0.7	006	BVM		
				005	BVO		K
	22.0-23.0			007	BVM		K
				006	BVO		K
	27.0-28.0	561	1	006	BVM	1,1,2,3,4,4-hexachloro-1,3-butadiene	K
		612	100	008	BVM	isomer of aldrin	
		613	0.5	008	BVM	cyclic hydrocarbon GT C-10	
				008	BVM		

A - No positive identification
D - Derived from natural products
E - Suspected laboratory contaminant
GT - Greater than
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 2 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
W21	27.0-28.0	613	7	008	BVM	hexachloro polycyclic bridged hydrocarbon	
		627	0.8	008	BVM	unknown aromatic	
		636	0.6	008	BVM	polycyclic bridged hydrocarbon	
W25	6.9-7.9	102	900	002	BVM	dichloropropene	
		116	40	002	BVM	dibromopropene	
		118	4	002	BVM	dibromopropane	
		542	300	003	BVP	1,3,5-trimethyl benzene (or isomer)	
		562	90	003	BVP	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		607	700	003	BVP	unknown with 3 chlorines	
		609	300	003	BVP	unknown with 3 chlorines	
		49	3	003	BVM	chloropropene	
		102	40	003	BVM	dichloropropene	
		115	2	004	BVP	dibromopropene	K
W26	16.2-17.2	609	0.4	004	BVM	hexadecanoic acid	K
		615	0.7	005	BVP	nonanedioic acid, dibutyl ester	D
		619	0.2	005	BVP		D
							A
W27	21.1-22.1	609	0.2	005	BVM	hexadecanoic acid	K
		615	0.5	006	BVP	nonanedioic acid, dibutyl ester	D
		619	0.2	006	BVP		D
							A
W27	26.2-27.2			006	BVM		K
		544	0.9	007	BVM	1-chloro-4(1-propynyl)-benzene	K
		551	0.8	002	BVZ	branched hydrocarbon, C-10	
		552	0.4	002	BVZ	decahydro-2-methyl naphthalene isomer	
		553	0.8	002	BVZ	decahydro-2-methyl naphthalene isomer	
		554	0.4	002	BVZ	pentachloro-1,3-butadiene	
		557	0.8	002	BVZ	pentachloro-1,3-butadiene isomer	
		558	1	002	BVZ	trichlorobenzene isomer	

A - No positive identification
D - Derived from natural products
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 3 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
W27	6.5-7.5	559	0.8	002	BVZ	1,1,2,3,4-hexachloro-1,3-butadiene isomer	
		560	2	002	BVZ	branched hydrocarbon, C-12	
		560	0.6	002	BVZ	ethyl dichlorobenzene isomer	
		562	50	002	BVZ	1,1,2,3,4-hexachloro-1,3-butadiene isomer	
		565	0.5	002	BVZ	branched hydrocarbon, C-13	
		566	1	002	BVZ	branched hydrocarbon, C-13	
		568	3	002	BVZ	branched hydrocarbon, C-13	
		568	1	002	BVZ	alkylated benzene, C-9	
		570	0.9	002	BVZ	tetrachlorobenzene isomer	
		572	0.4	002	BVZ	branched hydrocarbon, C-14	
		573	1	002	BVZ	branched hydrocarbon, C-14	
		574	1	002	BVZ	tetrachlorobenzene isomer	
		575	3	002	BVZ	branched hydrocarbon, C-14	
		575	0.6	002	BVZ	1,1-oxybis-benzene	
		576	0.5	002	BVZ	trichloro alkylated benzene	
		579	0.7	002	BVZ	2-butenedioic acid, bis(2-methylpropyl) ester	D
		579	1	002	BVZ	branched hydrocarbon, C-15	
		582	2	002	BVZ	branched hydrocarbon, C-15	
		582	4	002	BVZ	monochlorinated, possibly polychlorinated, cyclic aromatic hydrocarbon, C-10	
		583	6	002	BVZ	dichloro or probably tetrachloro cyclic aromatic hydrocarbon, C-10 (possibly benzene ethanol)	
		590	0.6	002	BVZ	possibly hexachloro indene type compound	
		595	0.9	002	BVZ	possibly isomer of naphtho(1,2-8) furan, 2,3-dihydro-2-(1-propenyl)	
		596	4	002	BVZ	possibly isomer of polychlorinated polycyclo paraffin or olefin	
		597	0.9	002	BVZ	polychlorinated hydrocarbon	
		597	0.4	002	BVZ	probably polychlorinated polycyclo paraffin or olefin	
		597	0.8	002	BVZ	probably polychlorinated polycyclo paraffin or olefin	
		599	0.6	002	BVZ	probably polychloro polycyclo olefin, C-10	

D - Derived from natural products
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 4 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
W27	6.5-7.5	601	10	002	BVZ	polychlorinated cyclic hydrocarbon, C-10	
		602	0.7	002	BVZ	tetrachlorinated methylbenzene	
		604	4	002	BVZ	polychlorinated acyclic hydrocarbon	
		605	2	002	BVZ	polychlorinated acyclic hydrocarbon	
		606	2	002	BVZ	polychlorinated cyclic hydrocarbon GT C-12	
		606	3	002	BVZ	polychlorinated acyclic hydrocarbon	
		608	0.7	002	BVZ	polychlorinated acyclic hydrocarbon	
		610	2	002	BVZ	polychlorinated acyclic hydrocarbon	
		611	20	002	BVZ	polychlorinated acyclic hydrocarbon, A	
		614	7	002	BVZ	polychlorinated acyclic hydrocarbon, GT C-11	
		614	0.8	002	BVZ	polychlorinated acyclic hydrocarbon, GT C-11	
		615	30	002	BVZ	1,2,3,4,10,10-hexachloro-1,4,4A,5,8,8A,-1,4,5,8 dimethanonaphthalene isomer alkylated benzene GT C-13	
		615	1	002	BVZ	polychlorinated alicyclic hydrocarbon possibly polychlorinated alicyclic hydrocarbon	
		618	0.7	002	BVZ	cyclic hydrocarbon, C-15, possibly polychlorinated alicyclic hydrocarbon	
		619	2	002	BVZ	hydrocarbon with 6 chlorines GT C-12	
		619	0.5	002	BVZ	isomer of 2,7:36 dimethanonaphth (2,3-B) oxirane, 3,4,5,6,9,9-hexachloro-1A, 2, 2A	
		623	0.7	002	BVZ	isomer of 1,1-(2,2,7-trichloroethylidene) bis(4-chloro-)benzene possibly o,p'-DDT	
		623	2	002	BVZ	polychlorinated acyclic hydrocarbon	
		624	0.4	002	BVZ	hexachlorinated acyclic hydrocarbon GT C-10	
		626	10	002	BVZ	2,5,7-metheno-3H-cyclopenta(A)pentalen-3-one, 3b,4,5,6,6A hexachloro	
		627	1	002	BVZ	polychlorinated acyclic hydrocarbon	
		628	2	002	BVZ	hexachlorinated acyclic hydrocarbon GT C-12	
		634	3	002	BVZ	polychlorinated acyclic hydrocarbon	
		634	1	002	BVZ	tetrachlorinated acyclic hydrocarbon	
		636	0.4	002	BVZ	GT C-12	
		639	1	002	BVZ	hexachlorinated acyclic hydrocarbon	
		642	0.6	002	BVZ	GT C-9	

A - No positive identification

GT - Greater than

* - Values reported are blank corrected

Site CS-SP

4924A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Montarget Compounds. Page 5 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
W27	11.5-12.5	536	1	008	BVW	tricyclo(2-2-1-02-6) heptan-3-ol	K
		549	20	003	BVZ	dibromochloropropane isomer	
		552	2	003	BVZ	hexachloro-1,3-butadiene isomer	A
		561	2	003	BVZ	2-butenedioic acid, bis(2-methylpropyl) ester	D
		579	0.8	003	BVZ	alkylated phenol GT C-15	
		583	0.4	003	BVZ	octachloro cyclopentene	
		591	0.4	003	BVZ	dichlorinated pyridine	A
		601	0.8	003	BVZ	1,1-(2,2,2-trichloroethylidene) bis(4-chloro) benzene	
		607	0.7	003	BVZ	hexachlorinated naphthalene	
		626	0.7	003	BVZ	branched hydrocarbon, C-25	
	16.2-17.2	636	0.5	003	BVZ		
		637	0.7	003	BVZ		
		553	2	002	BWC	pentamethyl disilane	K
		561	0.6	004	BVZ	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		579	0.6	004	BVZ	2-butenedioic acid, bis(2-methylpropyl) ester	
		599	0.4	004	BVZ	3,3,4,4-tetrabromo hexane	
		601	0.6	004	BVZ	cyclic hydrocarbon, C-10 with 6 chlorines	
		607	1	004	BVZ	hydrocarbon with 3 chlorines	
		609	1	004	BVZ	hydrocarbon with 3 chlorines	
		553	0.5	003	BWC	2-(dichloromethyl) 1,3 dioxolane	K
	21.2-22.2	579	0.6	005	BVZ	2-butenedioic acid, bis(2-methylpropyl) ester	D
		548	6	004	BWC		
		552	0.7	006	BVZ	dibromochloropropane isomer	K
		579	0.5	006	BVZ	2(dichloromethyl) 1,3-dioxolane	
		609	0.6	006	BVZ	2-butenedioic acid, bis (2-methyl propyl) ester	D
						hexadecanoic acid	D

A - No positive identification
D - Derived from natural products
GT - Greater than
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924N/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 6 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
4-3	3.2-4.2			005	BMC		K
				007	BVZ		K
	8.2-9.2	579	0.3	006	BMC		K
				008	BVZ	2-butenedioic acid, bis(2-methylpropyl) ester	D
		615	0.5	008	BVZ	nonanedioic acid, dibutyl ester	D
							K
	12.2-13.2			007	BMC		K
				009	BVC		K
	17.2-18.2	080 583	9 0.4	008	BMC	bromodichloromethane	
				010	BVZ	alkylated phenol, C-15	
	22.2-23.2	579	0.4	002	BWD		K
				002	BWA	2-butenedioic acid, (bis(2-methylpropyl) ester	Z
6-1	12.5-13.5			004	BUV		K
				014	BUW		K
	17.5-18.5	615	0.3	005	BUV		K
				015	BUW	nonanedioic acid, dibutyl ester	D
	23.5-24.5	579	0.3	006	BUV		K
				002	BUX	butenedioic acid, bis(2-methylpropyl) ester	D
		608 609 618 619	0.4 2 0.4 0.5	002	BUX	hexadecanoic acid	A
				002	BUX	octadecanoic acid	A
CS0101	29.0-30.0			007	BUV		K
				003	BUX		K
	4.0-5.0			003	BZI		K

A - No positive identification
 D - Derived from natural products
 Z - Suspected laboratory contaminant
 K - None detected
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 7 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0102	4.0-5.0	577	10	004	B2I	2,4,6-trichlorobenzeneamine or isomer	K
		578	10	009	B2D	unknown with 3 chlorines	
		614	8	009	B2D	cyanazine	
		619	0.9	009	B2D	octadecanoic acid	A
		620	2	009	B2D		D
		624	2	009	B2D		A
		635	2	009	B2D	alcohol, C-17	E
		637	0.7	009	B2D	bis(2-ethylhexyl) phthalate	C, F
CS0103	4.0-5.0	576	0.5	005	B2I	trichlorobenzeneamine	K
		592	0.4	002	B2H	6-chloro-N-ethyl-1,3,5-triazine-2,4-diamine	
		611	0.6	002	B2H	2-[4-chloro-6-(ethylamino)-1,3,5-triazin-2-yl] amino-2-methyl propanenitrile	
		612	6	002	B2H	2-[4-chloro-6-(ethylamino)-1,3,5-triazin-2-yl] amino-2-methyl propanenitrile	
		624	0.6	002	B2H	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropyl benzeneamine	
CS0104	4.0-5.0	576	3	006	B2I	trichlorobenzeneamine	K
		577	3	003	B2H	hydrocarbon with 3 chlorines	
		579	0.7	003	B2H	2-butenedioic acid diester	D
		604	0.4	003	B2H	unknown phthalate	C, F
		612	4	003	B2H	2-[4-chloro-6-(ethylamino)-1,3,5-triazin-2-yl] amino-2-methyl propanenitrile	
						possible metabolite of atrazine	
		624	0.7	003	B2H	hexanedioic acid diester	C, F
		630	0.4	003	B2H		
CS0105	4.0-5.0	576	4	007	B2I	trichlorobenzeneamine	K
		578	4	004	B2H	unknown hydrocarbon with 3 chlorines	
		593	0.7	004	B2H	6-chloro-N-ethyl-1,3,5-triazine-2,4-diamine	

A - No positive identification
 C - Plasticizer
 D - Derived from natural products
 E - Suspected laboratory contaminant
 F - Low concentration
 K - None detected
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 8 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification		Comments
CS0105	4.0-5.0	613	9	004	BZH	2-[(4-chloro-6(ethylamino)-1,3,5-triazine-2-yl) amino-2-methyl] propanenitrile		
		620	0.4	004	BZH	linear alkane, C-23		
		625	6	004	BZH	possible metabolite of atrazine		
		633	0.9	004	BZH	4-(methyldifonyl)-2,6-dinitro-N,N-dipropyl benzeneamine		
		635	0.4	004	BZH	alkene, C-25		
		648	3	004	BZH	hydrocarbon with 5 chlorines		
CS0106	4.0-5.0	576	7	008	BZI	trichlorobenzeneamine isomer		K
		578	6	005	BZH	dichlorosubstituted aromatic		
		596	2	005	BZH	6-chloro-N-ethyl-1,3,5-triazine-2,4-diamine		
		616	20	005	BZH	2-[(4-chloro-6(ethylamino)-1,3,5-triazine-2-yl) amino]-2-methyl propanenitrile		
		635	4	005	BZH	alkene or alcohol GT C-18		
CS0107	4.0-5.0	576	7	009	BZI	trichlorobenzeneamine isomer		K
		577	6	006	BZH	dichloro substituted aromatic		
		593	2	006	BZH	6-chloro-N-ethyl-1,3,5-triazine-4-diamine		
		613	6	006	BZH	2-[(4-chloro-6(ethyl-amino)-1,3,5-triazine-2-yl) amino]-2-methyl propanenitrile		
		629	2	006	BZH	unknown with one chlorine		
		634	10	006	BZH	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropyl benzeneamine		
CS0108	4.0-5.0	638	2	003	BZH	unknown phthalate		C, P
		640	0.6	006	BZH			A
		642	0.4	006	BZH			A
		644	3	006	BZH			A
		576	0.6	002	BZH	trichlorobenzeneamine isomer		K
		583	0.4	008	BZH			A
		593	1	008	BZH	6-chloro-N-ethyl-1,3,5-triazine-2,4-diamine		

A - No positive identification

C - Plasticizer

P - Low concentration

GT - Greater than

K - None detected

* - Values reported are blank corrected

Site CS-SP

4924A/1041A

Rev. 7/01/88

Table US-SP-11. Tentative Identification of Nontarget Compounds. Page 9 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0108	4.0-5.0	609	0.7	008	BZH	unknown phthalate	C, P
		613	9	008	BZH	2-[(4-chloro-6-(ethylamino)-1,3,5-triazine-2-yl) amino]-2-methyl propanenitrile	
		627	2	008	BZH	4-(methylsulfonyl)-2,6-di-N,N-dipropyl benzeneamine	A
		633	3	008	BZH	alkene or alcohol GT C-18	
		635	0.8	008	BZH	6-chloro-N-ethyl-1,3,5-triazine-2,4-diamine	
CS0109	4.0-5.0	593	0.6	003	BZH	unknown phthalate	K
		604	0.7	009	BZH	hexadecanoic acid plus an unknown	
		609	1	009	BZH	2-[(4-chloro-6-(ethylamino)-1,3,5-triazine-2-yl) amino]-2-methyl propanenitrile	C, P D + unknown
		613	7	009	BZH	4-(methylsulfonyl)-2,6-di-N,N-dipropyl benzeneamine	
		626	0.5	009	BZH	alkene or alcohol GT C-18	A
		633	0.7	009	BZH	bis butyl ester phthalate	
		635	0.7	009	BZH	hexadecanoic acid	D
		609	0.4	004	BZH	nonanedioic acid, dioctyl ester	
		620	0.4	002	BZH	tetradecanoic acid	K
		644	0.7	002	BZH	hexadecanoic acid	
CS0109	4.0-5.0	598	0.4	005	BZH	nonanedioic acid, dioctyl ester	K
		608	0.6	003	BZH	tetradecanoic acid	
		609	1	003	BZH	hexadecanoic acid	D
		615	0.4	003	BZH	nonanedioic acid, dibutyl ester	
		619	0.3	003	BZH	octadecanoic acid	D
		651	3	003	BZH	squalene	
		612	1	006	BZH	2-[(4-chloro-6-(ethyl amino)-1,3,5-triazin-2-yl) amino]-2-methyl propanenitrile	K
				004	BZH		

A - No positive identification
C - Plasticizer
D - Derived from natural products
P - Low concentration
GT - Greater than
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 10 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0109	8.0-9.0	632	2	004	BZL	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropyl benzeneamine	
		635	0.4	004	BZL	stearyl alcohol	D
		644	0.9	004	BZL	nonanediolic acid, dioctyl ester	D
	13.0-14.0	615	0.5	007	BZM	nonanediolic acid, dibutyl ester	K
		644	0.5	005	BZL	nonanediolic acid, dibutyl ester	D
		609	0.6	008	BZM	hexadecanoic acid	K
		612	1	006	BZL	2-[(4-chloro-6-(ethyl amino)-1,3,5-triazin-2-yl) amino]-2-methyl propanenitrile	D
	18.0-19.0	630	0.9	006	BZL	hexanediolic acid, dioctyl ester	C, P
		633	10	006	BZL	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropyl benzeneamine	
		642	0.3	006	BZL	nonanediolic acid, dioctyl ester	A
		644	2	006	BZL	unknown alkene or fatty acid	D
	22.0-23.0	648	0.4	006	BZL	squalene	D
		650	0.6	006	BZL		D
		604	0.4	002	BZR	dibutyl ester phthalate	K
		619	0.6	007	BZL	hexadecanoic acid	C, P
		630	0.9	007	BZL	hexadecanoic acid	D
		636	0.4	007	BZL	stearyl alcohol	D
		650	0.5	007	BZL	squalene	D
	3.0	576	40	007	BZH	trichlorobenzeneamine isomer	A
CS0110**		577	20	007	BZH	2-[(4-chloro-6-(ethyl amino)-1,3,5-triazin-2-yl) amino]-2-methyl propanenitrile	
		613	20	007	BZH		
		631	30	007	BZH		A
		641	70	007	BZH	unknown aromatic	A
		644	80	007	BZH		

A - No positive identification
 C - Plasticizer
 D - Derived from natural products
 P - Low concentration
 K - None detected
 * - Values reported are blank corrected
 ** - Grab sample

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 11 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0111	4.0-5.0	610	0.4	002	CAM	unknown phthalate	C, P
		612	6	002	CAM	2-((4-chloro-6-(ethyl amino)-1,3,5-triazin-2-yl) amino)-2-methyl propanenitrile	
		624	1	002	CAM	4-(methylsulfonyl)-2,6-dinitro-N,N-dipropyl benzenamine	A
		632	0.5	002	CAM	alkene, C-25	
		636	0.7	002	CAM	7-one, 3,12-dihydro-6-methoxy-3,3,12-trimethyl 7H-pyranol(2,3-C) acridin	
CS0201	7.0-8.8	651	1	002	CAM		
		102	300	005	BZR	dichloropropane isomer	
		109	20	005	BZR	bromochloropropane isomer	
		115	30	005	BZR	dibromopropane isomer	
		118	8	005	BZR	2,2-dibromopropane	
		132	6	005	BZR	chlorinated propane	
		134	400	005	BZR	dibromochloropropane isomer	
		138	30	005	BZR	3-methyl-1-ethyl benzene	
		142	100	005	BZR	dibromochloropropane isomer	
		535	4	010	BZL	alkane, C-9 plus an unknown	
		536	5	010	BZL	ethylmethyl benzene isomer	
		543	10	010	BZL	branched alkane, C-10	
		544	4	010	BZL	butylcyclohexane	
		553	5	010	BZL	branched hydrocarbon, C-11	
		554	40	010	BZL	2-(dichloromethyl)-1,3-dioxolane or silane	
		555	3	010	BZL	cyclic alkane, C-11	
		556	3	010	BZL	branched alkane, C-11	
		560	10	010	BZL	branched alkane, C-11	
		561	6	010	BZL	hexachloro-1,3-butadiene isomer	
		566	7	010	BZL	polyhalogenated hydrocarbon	
		569	8	010	BZL	hydrocarbon with 5 chlorines	
		583	5	010	BZL	analog of 1-phenyl-1,2-ethandiol	
		589	4	010	BZL	polychlorinated alkyl benzene	
		591	6	010	BZL	octachlorocyclopentene	
		593	7	010	BZL	polychlorinated alkyl benzene	
		595	5	010	BZL	chlorinated alkyl benzene	
		599	40	010	BZL	tetrabromohexane isomer	
		601	10	010	BZL	bridged polycyclic hexachlorinated hydrocarbon	
		604	5	010	BZL	bridged polycyclic hexachlorinated hydrocarbon	

A - No positive identification

C - Plasticizer

P - Low concentration

* - Values reported are blank corrected

Site CS-SP

4924A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 12 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0201	7.8-8.8	607	60	010	B2L	hydrocarbon with 3 chlorines	
		609	10	010	B2L	bridged polycyclic hexachlorinated hydrocarbon	
		610	10	010	B2L	aromatic hydrocarbon with 3 chlorines	
		615	30	010	B2L	bridged polycyclic hexachlorinated hydrocarbon	
		617	50	010	B2L	bridged polycyclic hexachlorinated hydrocarbon	
		618	10	010	B2L	bridged polycyclic hexachlorinated hydrocarbon	
CS0202	7.8-8.8	634	4	010	B2L	bridged polycyclic tetrachlorinated hydrocarbon	
		636	20	010	B2L	bridged polycyclic hexachlorinated hydrocarbon	
		102	30	006	B2R	dichloropropene isomer	
		109	2	006	B2R	bromochloropropene isomer	
CS0203	7.8-8.8	115	2	006	B2R	dibromochloropropene isomer	
		135	7	006	B2R	dibromochloropropene isomer	
		143	2	006	B2R	dibromochloropropene isomer	
		102	100	003	B2R	dichloropropene isomer	
		109	7	003	B2R	bromochloropropene isomer	
		116	10	003	B2R	2,3-dibromopropene	
		136	30	003	B2R	dibromochloropropene isomer	
		143	10	003	B2R	dibromochloropropene isomer	
		535	6	008	B2L	unknown alkane and alkyl benzene	
		536	9	008	B2L	ethylmethyl benzene isomer	
		537	30	008	B2L	polybrominated chloropropene	
		538	6	008	B2L	methylpropyl cyclohexane isomer	
		546	4	008	B2L	decahydronaphthalene	
		553	10	008	B2L	alkane, C-10	
		554	40	008	B2L	unknown silicon containing hydrocarbon	
		554	7	008	B2L	substituted cyclohexane	
		556	6	008	B2L	branched alkane, C-11 plus C-4 alkyl benzene	
		559	6	008	B2L	naphthalene	
		560	20	008	B2L	branched alkane, C-12	
CS0204	7.8-8.8	561	30	008	B2L	hexachloro-1,3-butadiene isomer	
		563	5	008	B2L	alkane with 6 chlorines	
		566	9	008	B2L	alkane with 6 chlorines	
		569	9	008	B2L	pentachlorocyclohexadiene	
		571	8	008	B2L	possibly bromoaniline	
		574	10	008	B2L	tetrachlorobenzene isomer	
		583	4	008	B2L	alkoxy aromatic	

* - Values reported are blank corrected

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 13 of 35.

Borehole Number	Interval Depth (ft.)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0203	7.8-8.8	586	10	008	BZL	alkane with 5 chlorines	
		589	4	008	BZL	alkane with 5 chlorines	
		591	30	008	BZL	octachlorocyclopentene	
		599	40	008	BZL	tetrabromohexane isomer	
		601	60	008	BZL	isomer of aldrin or isodrin	
		604	6	008	BZL	bridged polycyclic polychlorinated hydrocarbon	
		607	40	008	BZL	hydrocarbon with 3 chlorines	
		607	10	008	BZL	hydrocarbon with 3 chlorines	
		610	6	008	BZL	tetradeconoic acid plus an unknown	D + unknown
		613	20	008	BZL	bridged polycyclic polychlorinated hydrocarbon	
		615	8	008	BZL	polycyclic hydrocarbon	
		625	6	008	BZL	heptachlorinated polycyclic hydrocarbon	
		626	5	008	BZL	bridged polychlorinated polycyclic hydrocarbon	
		627	5	008	BZL	isomer of aldrin	
		634	4	008	BZL	isomer of endrin	
CS0204	7.8-8.8	635	30	008	BZL	bridged polychlorinated polycyclic hydrocarbon	
		641	4	008	BZL	unknown chlorinated hydrocarbon	
		102	60	004	BZR	dichloropropene isomer	
		109	7	004	BZR	bromochloropropene isomer	
		115	10	004	BZR	2,3-dibromopropene	
		117	3	004	BZR	unsaturated hydrocarbon	
		135	60	004	BZR	dibromochloropropene isomer	
		143	70	004	BZR	dibromochloropropene isomer	
		536	8	009	BZL	ethylmethyl benzene isomer	
		536	10	009	BZL	dibromochlorinated propane isomer	
		541	4	009	BZL	dibromochlorinated propane isomer	
		553	20	009	BZL	possibly silane or 2-polychloromethyl-1,3-dioxolane	
		554	4	009	BZL	unknown cyclic hydrocarbon	
		557	6	009	BZL	unknown polycyclic bridged hydrocarbon	
		560	7	009	BZL	alkane, C-12	
		561	20	009	BZL	hexachloro-1,3-butadiene isomer	
		569	4	009	BZL	pentachloro cyclopentadiene	
		571	9	009	BZL	possibly bromoaniline	
		574	9	009	BZL	tetrachlorobenzene isomer	
		586	10	009	BZL	pentachloroethane	
		589	4	009	BZL	alkane with 6 chlorines	
		591	20	009	BZL	octachlorocyclopentene	
		599	20	009	BZL	tetrabromohexane isomer	

D - Derived from natural products
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 14 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0204	7.8-8.8	601	40	009	BZL	bridged polycyclic polychlorinated hydrocarbon	
		604	5	009	BZL	polycyclic polychlorinated hydrocarbon	
		607	40	009	BZL	hydrocarbon with 2 chlorines	
		607	8	009	BZL	hydrocarbon with 2 chlorines	
		615	6	009	BZL	unknown polychlorinated hydrocarbon	
		625	3	009	BZL	bridged polycyclic hexachlorinated hydrocarbon	
		627	4	009	BZL	bridged polycyclic hexachlorinated hydrocarbon	
		635	20	009	BZL	bridged polycyclic hexachlorinated hydrocarbon	
CS0205	7.8-8.8	102	40	007	BZR	dichloropropene isomer	
		135	30	007	BZR	dibromochloropropane isomer	
CS0206	7.8-8.8	102	2	008	BZR	dichloropropene isomer	
		135	4	008	BZR	dibromochloropropane isomer	
CS0207	7.8-8.8			002	BZU		K
				003	BZU	unsaturated alicyclic hydrocarbon	
		81	700	003	BZU	1,3-dichloropropene	
		88	9	003	BZU	bromochloropropane isomer	
		102	500	003	BZU	bromochloropropane isomer	
		109	4	003	BZU	unsaturated alicyclic hydrocarbon	
		111	40	003	BZU	2,3-bromopropene	
		115	40	003	BZU	unknown aromatic	
		128	400	003	BZU	dibromochloropropane isomer	
		135	70	003	BZU	dibromochloropropane isomer	
		143	20	003	BZU		
CS0208	7.8-8.8			004	BZU		K
				005	BZU	dichloropropene isomer	
		102	20	005	BZU	octane isomer	
CS0301	11.5-12.5			008	CAC	hexachloroethane	K
		550	20	008	CAC	1,2,3,4-tetrachloro-1,3-cyclopentadiene	
		557	20	008	CAC	unknown with 5 chlorines	
		563	90	008	CAC	unknown with 5 chlorines	
		563	100	008	CAC	unknown with 5 chlorines	
		570	100	008	CAC	unknown with 5 chlorines	
		590	20	008	CAC	unknown with 4 chlorines	
		596	90	008	CAC	unknown with 4 chlorines	
		601	90	008	CAC	chlordene	A
		604	80	008	CAC		

A - No positive identification

K - None detected

* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Non-target Compounds. Page 15 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0301	11.5-12.5	606	40	008	CAC		A
		607	40	008	CAC	unknown with 4 chlorines	A
		627	20	008	CAC		A
		637	10	008	CAC		A
CS0302	11.5-12.5	556	80	002	CAP		K
				009	CAC	1,2,3,4-tetrachloro-1,3-cyclopentadiene or isomer	
		561	60	009	CAC	1,2,3,4-tetrachloro-1,3-cyclopentadiene or isomer	
		562	200	009	CAC	unknown with 5 chlorines	
		562	300	009	CAC	unknown with 5 chlorines	
		570	100	009	CAC	unknown with 5 chlorines	
		596	100	009	CAC	unknown with 5 chlorines	
		601	100	009	CAC	chlordene	A
		604	100	009	CAC		
CS0303	11.5-12.5	562	8	003	CAP	unknown with 5 chlorines	K
		562	10	010	CAC	unknown with 5 chlorines	
		570	20	010	CAC	unknown with 5 chlorines	
CS0304	11.5-12.5	143	50	004	CAP	unknown with 4 chlorines	
		156	5	004	CAP	pentachloro-1-propene	
		163	3	004	CAP	unknown with 4 chlorines	
		186	40	004	CAP	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		199	5	004	CAP	pentachloro-1,3-butadiene	
		561	30	002	CAD	1,2,3,4-tetrachloro-1,3-cyclopentadiene	
		561	20	002	CAD	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		562	10	002	CAD	hydrocarbon with 3 chlorines	
		568	10	002	CAD	pentachlorocyclohexane	
		569	70	002	CAD	hydrocarbon with 5 chlorines	
		572	4	002	CAD	hexachlorobutadiene isomer	
		585	10	002	CAD		
		590	20	002	CAD		
		591	6	002	CAD	2,3,4,5-tetrachloro-3a,6,7,7a-tetrahydro-1,6-methano-1H-indene	A
		594	6	002	CAD	1,2-dichloro-3,4-bis(dichloromethylene) cyclobutane	
		595	20	002	CAD	tetrachlorocyclopropene	
						bicyclo(2.2.2)oct-5-ene-2,3-dicarbonitrile	
		596	80	002	CAD	4,5,6,7,8-hexachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	

A - No positive identification

K - None detected

* - Values reported are blank corrected

Site CS-SP

4924A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 16 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0304	11.5-12.5	597	20	002	CAD	1,2,3,4,5,7,7-heptachlorobicyclo(2.2.1)-hept-2-ene	
		599	30	002	CAD	bicyclo(2.2.2)oct-5-ene-2,3-dicarbon-trile	
		601	100	002	CAD	4,5,6,7,8-hexachloro-3a,4,7,7a-tetrahydro-4,7-methano-1H-indene	
		604	90	002	CAD	bicyclo(2.2.2)oct-5-ene-2,3-dicarbon-trile	
		606	50	002	CAD	bicyclo(2.2.2)oct-5-ene-2,3-dicarbon-trile	
		607	20	002	CAD	1,1a,4,5,5a,6-hexachlorooctahydro-1,3,5-methano-1H-cyclopropa(A)pentalene	A
		608	7	002	CAD	hydrocarbon with 6 chlorines	
		610	8	002	CAD	hydrocarbon with 7 chlorines	
		611	20	002	CAD	hydrocarbon with 6 chlorines	
		612	4	002	CAD	hydrocarbon with 6 chlorines	
CS0305	11.5-12.5	614	7	002	CAD	hydrocarbon with 6 chlorines	
		618	6	002	CAD	hydrocarbon with 6 chlorines	
		626	6	002	CAD	metabolite or isomer of isodrin	
		628	40	002	CAD	metabolite or isomer of aldrin	
		083	4	005	CAP	unknown with 3 chlorines	
		143	9	005	CAP	dichloroethyl ether	
		164	2	005	CAP	pentachloro-1,3-butadiene	
		186	3	005	CAP	1,1,2,3,4,4-hexachloro-1,3-butadiene	K
				003	CAD		K
							D
CS0306	11.5-12.5	609	0.5	002	CAL	hexadecanoic acid	K
				007	CAD		D
	15.5-16.5	630	0.6	003	CAL	hexadecanoic acid, dioctyl ester	K
				008	CAD		D
	20.5-21.5	615	0.6	004	CAL	nonanedioic acid, dibutyl ester	K
		637	0.4	009	CAD	unknown alcohol or alkene GT C-18	D
				009	CAD		D
	25.5-26.5			005	CAL		K
				010	CAD		K

A - No positive identification
D - Derived from natural products
GT - Greater than
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 17 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
CS0307	11.5-12.5	605	0.3	006	CAB	butyl 2-ethylhexyl phthalate	K
		630	1	006	CAC	hexanedioic acid, mono(2-ethylhexyl) ester	C, P
		635	0.3	006	CAC	alkene, C-18	C, P
	15.5-16.5	635	0.4	007	CAB	alkene, C-18	K
		635	0.4	007	CAC	alkene, C-18	E
	20.5-21.5	615	1	006	CAP	nonanedioic acid, dibutyl ester	K
		630	0.4	005	CAD	nonanedioic acid, dibutyl ester	D
	25.5-26.5	615	1	007	CAP	nonanedioic acid, dioctyl ester	K
		630	0.4	005	CAD	nonanedioic acid, dioctyl ester	D
CS0308	10.8	083	2	008	CAP	unknown with 3 chlorines	A
		095	1	008	CAP	hexanedioic acid, dioctyl ester	C, P
		630	0.4	006	CAD	hexanedioic acid, dioctyl ester	C, P
MRE021	5.9-6.8	526	3	002	BQX	branched hydrocarbon, C-7	A
		529	8	002	BQX	ethylmethyl benzene	
		531	20	002	BQX	dibromochloropropane	
		531	20	002	BQX	trimethyl benzene	A
		535	40	002	BQX	branched hydrocarbon, C-9	
		539	60	002	BQX	cyclic hydrocarbon, C-9	
		540	5	002	BQX	branched hydrocarbon, C-9	A
		541	9	002	BQX	cyclic hydrocarbon, C-9	
		543	4	002	BQX	branched hydrocarbon, C-9	
		544	6	002	BQX	branched hydrocarbon, C-9	A
		544	4	002	BQX	branched hydrocarbon, C-9	
		545	4	002	BQX	halogenated hydrocarbon	
		547	70	002	BQX	halogenated hydrocarbon	A
		549	2000	002	BQX	halogenated hydrocarbon	
		550	10	002	BQX	halogenated hydrocarbon	
		550	8	002	BQX	halogenated hydrocarbon	A
		551	30	002	BQX	halogenated hydrocarbon	
		551	50	002	BQX	diethylmethyl benzene	A

A - No positive identification
C - Plasticizer
D - Derived from natural products
E - Suspected laboratory contaminant
P - Low concentration
K - None detected
* - Values reported are blank corrected

Site CS-SP
4924A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 18 of 35.

Borehole Number	Interval		Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
	Depth (ft)							
MR021	5.9-6.8		552	20	002	BQX	branched hydrocarbon, C-10	
			552	30	002	BQX	cyclic hydrocarbon, C-10	
			553	9	002	BQX	alkylated benzene	
			554	20	002	BQX	alkylated benzene	
			555	9	002	BQX	branched hydrocarbon, C-11	
			555	20	002	BQX	branched hydrocarbon, C-11	
			556	5	002	BQX	alkylated benzene	
			557	10	002	BQX	polyaromatic hydrocarbon	
			559	40	002	BQX	branched hydrocarbon, C-11	
			560	30	002	BQX	1,1,2,3,4-hexachloro-1,3-butadiene	
			563	5	002	BQX		A
			565	9	002	BQX		A
			569	9	002	BQX		A
			569	3	002	BQX	dichloro-chloroethenyl-benzene	
			571	10	002	BQX		A
			574	10	002	BQX		A
			575	7	002	BQX	dimethyl naphthelene	
			576	4	002	BQX	dimethyl naphthelene	
			578	8	002	BQX	dimethyl naphthelene	
			582	10	002	BQX		A
			585	80	002	BQX		A
			585	30	002	BQX	pentachloroethane	
			587	6	002	BQX		A
			591	10	002	BQX	octachlorocyclopentene	
			593	7	002	BQX		A
			593	4	002	BQX	unknown chlorinated benzene	
			595	30	002	BQX		A
			599	70	002	BQX		A
			601	6	002	BQX		A
			601	10	002	BQX		A
			603	9	002	BQX	chlordene	
			604	80	002	BQX		A
			605	20	002	BQX		A
			606	10	002	BQX		A
			606	20	002	BQX		A
			607	100	002	BQX		A
			607	1000	002	BQX		A
			608	6	002	BQX		A
			609	100	002	BQX		A
			610	200	002	BQX		A
			615	20	002	BQX	1-chloro-4-(2,2-dichloro-1-phenylethyl) benzene	

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 19 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MK2021	5.9-6.6	616	6	002	BQX	crotoxyphos	
		619	70	002	BQX	tetrachlorvinphos	A
		620	20	002	BQX		
		622	6	002	BQX	m,p'-DDD isomer	
		625	30	002	BQX	m,p'-DDD isomer	A
		627	8	002	BQX		A
		631	5	002	BQX		A
		632	4	002	BQX	niralin	
		633	4	002	BQX		A
		635	4	002	BQX		A
		636	10	002	BQX		A
		636	40	002	BQX		A
		637	20	002	BQX		A
		638	60	002	BQX		A
		640	50	002	BQX		A
		641	100	002	BQX		A
		643	4	002	BQX	branched hydrocarbon, C-26	
		646	9	002	BQX	branched hydrocarbon, C-26	
		650	5	002	BQX	branched hydrocarbon, C-26	
MK2022	5.7-6.5	541	4	003	BQX		A
		543	1	003	BQX	trimethylbenzene	
		544	1	003	BQX		A
		545	0.4	003	BQX	hexachloroethane	
		551	2	003	BQX	branched hydrocarbon, C-11	
		553	0.5	003	BQX		A
		560	0.6	003	BQX		A
		561	1	003	BQX	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		568	0.5	003	BQX	branched hydrocarbon, C-12	
		575	0.7	003	BQV		A
		576	0.7	003	BQX		A
		577	0.7	003	BQX		A
		577	0.4	003	BQX	dimethyl naphthelene	
		583	0.7	003	BQX	1-chloro-3-trichlorethynyl benzene	
		585	0.4	003	BQX		A
		588	10	003	BQX		A
		589	0.9	003	BQX	unknown chlorinated hydrocarbon	
		591	0.6	003	BQX	octachloro cyclopentene	
		593	1	003	BQX		A
		594	0.6	003	BQX	1,4-dichloro-2-(2-chloroethyl)-benzene	
		595	3	003	BQX		A

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 20 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MRB022	5.7-6.5	603	0.4	003	BQX		A
		605	4	003	BQX		A
		607	80	003	BQX		A
		609	7	003	BQX		A
		610	10	003	BQX		A
		615	0.8	003	BQX		A
		616	0.5	003	BQX		A
		619	2	003	BQX	tetrachlorvinphos	A
		621	0.4	003	BQX		
		621	0.4	003	BQX	DDE isomer	
		622	0.4	003	BQX	DDD isomer	
		626	0.8	003	BQX	DDD isomer	
		626	2	003	BQX	DDT isomer	
		627	0.5	003	BQX	chlorinated unknown	
		628	0.6	003	BQX	chlorinated unknown	
		634	0.4	003	BQX	possibly endrin ketone	
		634	0.4	003	BQX	polycyclic hydrocarbon	
		635	0.4	003	BQX		A
		636	0.5	003	BQX	chlorinated unknown	
		636	2	003	BQX	chlorinated unknown	
		637	1	003	BQX	chlorinated unknown	
		638	2	003	BQX	chlorinated unknown	
		640	2	003	BQX	chlorinated unknown	
		641	3	003	BQX	chlorinated unknown	
MRB023	5.8-6.8	527	4	004	BQX	branched hydrocarbon, C-8	
		530	10	004	BQX	alkylated benzene	
		532	50	004	BQX	ethylmethyl benzene	
		532	40	004	BQX	trimethyl benzene	
		534	10	004	BQX	ethylmethyl benzene	
		536	70	004	BQX	trimethyl benzene	A
		538	8	004	BQX		
		540	50	004	BQX	branched hydrocarbon, C-9	
		541	4	004	BQX		A
		542	4	004	BQX	branched hydrocarbon, C-9	
		544	10	004	BQX		A
		545	6	004	BQX	branched hydrocarbon, C-9	
		546	10	004	BQX	hexachloro ethane	
		549	90	004	BQX	branched hydrocarbon, C-10	
		550	4	004	BQX	unknown alkylated benzene	

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 21 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MEB023	5.8-6.8	550	4	004	BQX	cyclic hydrocarbon, C-10	
		551	10	004	BQX	unknown alkylated benzene	A
		552	10	004	BQX	branched hydrocarbon, C-10	
		553	9	004	BQZ		A
		554	4	004	BQX	unknown alkylated benzene	
		555	4	004	BQX	branched hydrocarbon, C-11	
		555	10	004	BQX	branched hydrocarbon, C-11	
		557	6	004	BQX		A
		560	20	004	BQX	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		561	5	004	BQX		A
		566	4	004	BQX		A
		570	4	004	BQX		A
		575	5	004	BQX	dimethyl naphthalene	
		577	5	004	BQX	dimethyl naphthalene	
		583	9	004	BQX		A
		585	9	004	BQX		A
		586	20	004	BQX	pentachloroethane	
		589	40	004	BQX		A
		601	9	004	BQX	chlordene isomer	
		603	5	004	BQX		A
		604	40	004	BQX		A
		605	30	004	BQX		A
		606	6	004	BQX		A
		607	100	004	BQX		A
		609	400	004	BQX	dichlorinated pyridine	
		611	40	004	BQX	dichlorinated pyridine	
		619	6	004	BQX	tetrachlorvinphos	
		622	4	004	BQX	mitotane isomer	
		626	6	004	BQX	m,p'-DDD isomer	
		636	8	004	BQX		A
		636	20	004	BQX		A
		637	10	004	BQX		A
		638	30	004	BQX		A
		640	20	004	BQX		A
		641	40	004	BQX		A
		642	4	004	BQX		A

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4924A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 22 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MR031	8.7-9.5	548	4	002	BRC	hexachloroethane	
		561	100	002	BRC	1,1,2,3,4-hexachloro-1,3-butadiene	
		601	60	002	BRC	chlordene	
		604	5	002	BRC	cyclic hydrocarbon, C-18	A
		614	10	002	BRC		
		615	7	002	BRC	unknown substituted benzene	
		622	7	002	BRC	m,p'-DDD	
		623	4	002	BRC	polychlorinated hydrocarbon	
		626	7	002	BRC	m,p'-DDD isomer	
		626	10	002	BRC	p,p'-DDT isomer	A
		626	10	002	BRC		A
		628	40	002	BRC		A
		630	5	002	BRC		A
MR033	9.6-9.9	547	4	003	BRC	hexachloroethane	
		551	30	003	BRC	branched hydrocarbon, C-11	
		552	4	003	BRC	branched hydrocarbon, C-11	
		553	9	003	BRC	hydrocarbon, C-11	
		554	4	003	BRC	branched hydrocarbon, C-11	
		556	6	003	BRC	branched hydrocarbon, C-11	
		556	3	003	BRC	branched hydrocarbon, C-11	
		556	6	003	BRC	branched hydrocarbon, C-11	
		560	20	003	BRC	branched hydrocarbon, C-12	
		561	20	003	BRC	1,1,2,3,4-hexachloro-1,3-butadiene	
		565	5	003	BRC	branched hydrocarbon, C-12	
		568	20	003	BRC	branched hydrocarbon, C-13	
		569	3	003	BRC	branched hydrocarbon, C-13	
		573	4	003	BRC	branched hydrocarbon, C-13	
		575	10	003	BRC	branched hydrocarbon, C-14	
		579	5	003	BRC	branched hydrocarbon, C-14	
		582	10	003	BRC	branched hydrocarbon, C-15	
		590	9	003	BRC		A
		595	4	003	BRC	branched hydrocarbon, C-17	
		596	30	003	BRC		A
		598	6	003	BRC		A
		599	5	003	BRC		A
		601	50	003	BRC	chlordene	
		602	6	003	BRC	polychlorinated methyl benzene	
		604	20	003	BRC	cyclic hydrocarbon, C-19	

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 23 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
NR033	9.6-9.9	605	10	003	BRC	polychlorinated methyl benzene	A
		606	10	003	BRC	polychlorinated methyl benzene	
		606	20	003	BRC	polychlorinated methyl benzene	C, P
		608	20	003	BRC	polychlorinated naphthalene	
		610	7	003	BRC	unknown phthalate	A
		613	30	003	BRC	unknown diester, C-9	
		615	6	003	BRC	unknown diester, C-9	A
		621	100	003	BRC	unknown diester, C-9	
		622	20	003	BRC	m,p'-DDD isomer	A
		624	4	003	BRC	m,p'-DDD isomer	
		625	5	003	BRC	unknown chlorinated aromatic	A
		626	100	003	BRC	chlorophenothalene isomer	
		628	10	003	BRC	chloridene isomer	A
		630	90	003	BRC	DDT isomer	
		632	8	003	BRC	polychlorinated aromatic hydrocarbon	A
		644	6	003	BRC	polychlorinated aromatic hydrocarbon	
NR042	7.7-8.2	535	6	005	BQM	unknown hydrocarbon, C-7	A
		539	1	005	BQM	dichlorobenzene isomer	
		541	3	005	BQM	trimethyl benzene isomer	A
		542	2	005	BQM	dichlorobenzene isomer	
		545	0.6	005	BQM	unknown hydrocarbon, C-10	A
		547	3	005	BQM	hydrocarbon with 5 chlorines	
		548	20	005	BQM	alkylated alkane, C-10	A
		550	10	005	BQM	alkylated alkane, C-10	
		551	9	005	BQM	3,5,5-trimethyl,2-cyclohexen-1-one	A
		552	30	005	BQM	unknown cyclic hydrocarbon, C-11	
		553	1	005	BQM	unknown with 2 chlorines	A
		555	1	005	BQM	unknown with 2 bromines	
		556	3	005	BQM	trichlorobenzene isomer	A
		557	10	005	BQM	trichlorocyclopentene	
		558	8	005	BQM	unknown with 6 chlorines	A
		558	0.8	005	BQM	alkylated alkane, C-13	
		559	3	005	BQM	unknown with 6 chlorines	A
		561	20	005	BQM	possibly trichloro cyclopentene	
		562	3	005	BQM	unknown with one chlorine	A
		563	2	005	BQM	cyclic hydrocarbon, C-10	
		564	1	005	BQM	unknown with 3 chlorines	A
		564	3	005	BQM	unknown with 3 chlorines	
		565	2	005	BQM	unknown with 3 chlorines	A
		566	4	005	BQM	unknown with 3 chlorines	
		567	2	005	BQM	unknown with 3 chlorines	A
		567	2	005	BQM	unknown with 3 chlorines	

A - No positive identification

C - Plasticizer

P - Low concentration

* - Values reported are blank corrected

Site CS-SP

4928A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 24 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
WSE042	7.7-8.2	568	10	005	BQW	tetrachlorocyclopentene chlorinated unknown	A
		569	1	005	BQW		A
		570	8	005	BQW		
		571	4	005	BQW		
		572	0.7	005	BQW	unknown with 5 chlorines	
		573	10	005	BQW	polycyclic hydrocarbon, possibly alkylated naphthalene	
		575	20	005	BQW	1,1'-oxybisbenzene	
		578	1	005	BQW	unknown polycyclic hydrocarbon	
		579	0.5	005	BQW	alkylated hydrocarbon, C-16	
		580	2	005	BQW	unknown with 3 chlorines	
		581	0.9	005	BQW	unknown with 5 chlorines	
		582	4	005	BQW		A
		583	6	005	BQW		A
		584	1	005	BQW	possibly pentachlorobenzene	
		585	9	005	BQW	possibly pentachloroethane	
		589	6	005	BQW		A
		591	10	005	BQW	possibly octachlorocyclopentene	
		593	1	005	BQW	trimethyl phenol isomer	
		594	2	005	BQW	trichloro aromatic	
		596	3	005	BQW	unknown with 6 chlorines	A
		597	3	005	BQW		
		597	3	005	BQW	possibly trimethyl phenol isomer	
		598	1	005	BQW	unknown, possibly brominated	
		599	4	005	BQW	unknown, possibly brominated	
		601	9	005	BQW	possibly chlordene	
		601	20	005	BQW	possibly chlordene	
		604	8	005	BQW	polycyclic bridged hydrocarbon	
		604	1	005	BQW	unknown with 3 chlorines	
		606	0.9	005	BQW	unknown with 2 chlorines	
		606	10	005	BQW	unknown with 3 chlorines	
		607	3	005	BQW	unknown with 3 chlorines	
		607	3	005	BQW	unknown with 3 chlorines	
		608	8	005	BQW		A
		608	1	005	BQW		A
		610	2	005	BQW	possibly isomer of aldrin	
		611	10	005	BQW	unknown with 3 chlorines	
		611	5	005	BQW	unknown phthalate	C, P
		613	300	005	BQW	possibly isomer of aldrin	
		614	3	005	BQW	chlorinated unknown	

A - No positive identification

C - Plasticizer

P - Low concentration

* - Values reported are blank corrected

Site CS-SP

4928A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 25 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MR042	7.7-8.2	614	5	005	BQW	possibly isomer of isodrin	A
		615	3	005	BQW	possibly akton or crotoxyphos	
		617	1	005	BQW	possibly akton	D
		618	1	005	BQW	akton	
		618	20	005	BQW	possibly hexadecanoic acid	A
		621	30	005	BQW	possibly isomer of isodrin	
		623	1	005	BQW	possibly isomer of isodrin	D
		625	0.8	005	BQW	possibly isomer of isodrin	
		625	2	005	BQW	possibly isomer of DDT	A
		626	4	005	BQW	polycyclic bridged hydrocarbon	
		626	4	005	BQW	chlorinated unknown	D
		627	1	005	BQW	polycyclic bridged hydrocarbon	
		628	10	005	BQW	octadecanoic acid isomer	D
		630	1	005	BQW	bridged polycyclic hydrocarbon	
		630	0.7	005	BQW	bridged polycyclic hydrocarbon	C, P
		631	1	005	BQW	bridged polycyclic hydrocarbon	
		632	1	005	BQW	chlorinated unknown	A
		633	1	005	BQW	chlorinated unknown	
		634	2	005	BQW	possibly endrin ketone	A
		634	3	005	BQW	unknown alkene or alcohol GT C-18	
MR043	7.7-8.2	635	8	005	BQW	chlorinated unknown	A
		636	2	005	BQW	chlorinated unknown	
		637	1	005	BQW	diethyl phthalate	C, P
		637	0.5	005	BQW	bridged polycyclic hydrocarbon	
		638	2	005	BQW	chlorinated unknown	A
		640	6	005	BQW	chlorinated unknown	
		641	5	005	BQW	chlorinated unknown	A
		643	0.8	005	BQW	possibly isomer of aldrin	
		647	1	005	BQW	unknown hydrocarbon, C-9	A
		538	0.6	006	BQW	hexachloroethane	
		545	60	006	BQW	triethyl decane	A
		548	3	006	BQW	1-(1-ethoxyethoxy)-hexene isomer	
		551	3	006	BQW	unknown hydrocarbon, C-11	A
		553	4	006	BQW	pentachloro hydrocarbon, C-11	
		556	0.5	006	BQW	trichloro benzene isomer	A
		557	0.8	006	BQW		
		558	3	006	BQW		

A - No positive identification
C - Plasticizer
D - Derived from natural products
P - Low concentration
GT - Greater than
* - Values reported are blank corrected

Site CS-SP
4928A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 26 of 35.

Borehole Number	Interval		Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
	Depth (ft)							
MK043	7.7-8.2		559	6	006	BQM	trichlorocyclopentene	
			560	2	006	BQM	alkynated hydrocarbon, C-11	
			561	5	006	BQM	tetrachloro cyclohydrocarbon	
			561	10	006	BQM	1,1,2,3,4,4-hexachloro-1,3-butadiene	
			562	3	006	BQM	unknown with 4 chlorines	
			563	2	006	BQM	trichloro cyclopentene	
			565	0.4	006	BQM	unknown hydrocarbon, C-12	
			566	3	006	BQM	unknown pentachloro aromatic	
			567	3	006	BQM	trichlorocyclopentane	
			568	1	006	BQM	alkynated hydrocarbon, C-13	
			570	30	006	BQM	polycyclic bridged hydrocarbon	
			570	4	006	BQM	tetrachloro benzene isomer	
			571	0.8	006	BQM	unknown with 6 chlorines	
			572	0.6	006	BQM	unknown with 4 chlorines	
			572	0.4	006	BQM	tetrachloro unknown aromatic	
			574	30	006	BQM	2-ethenyl-naphthalene	
			575	3	006	BQM	unknown hydrocarbon with 5 chlorines	
			576	50	006	BQM	1,1'-oxybis benzene	
			577	2	006	BQM	hexachlorobutene	
			579	0.5	006	BQM	unknown hydrocarbon, C-15	
			581	0.7	006	BQM	tetrachlorocyclopentene	
			582	2	006	BQM	unknown with 6 chlorines	
			583	0.7	006	BQM	pentachloro unknown aromatic	
			584	9	006	BQM	pentachloro benzene	
			586	1	006	BQM	unknown with 4 chlorines	
			591	2	006	BQM	octachloro cyclic hydrocarbon, C-16	
			594	1	006	BQM	tetrachloro unknown aromatic	
			596	30	006	BQM	1,2,3,4-tetrachloro-5-(dichloromethylene)- 1,3-cyclopentadiene	
			597	0.9	006	BQM	hexachloro unknown aromatic	
			598	0.6	006	BQM	possibly isomer of chlordene	
			601	20	006	BQM	chlordene	
			604	3	006	BQM	polycyclic bridged hydrocarbon	
			604	0.4	006	BQM	monochloro unknown aromatic	
			606	3	006	BQM	polycyclic bridged hydrocarbon	
			607	0.4	006	BQM	unknown with 3 chlorines	
			607	0.3	006	BQM		A
			608	1	006	BQM		A
			608	0.4	006	BQM	heptachloro unknown aromatic	
			609	0.5	006	BQM		A

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Table CS-NP-11. Tentative Identification of Nontarget Compounds. Page 27 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MK2043	7.7-8.2	610	0.8	006	BQW	unknown phthalate	C, P
		612	0.6	006	BQW	tetrachloro unknown aromatic	
		613	0.7	006	BQW	tetrachloro unknown aromatic	
		616	0.8	006	BQW	hexachloro unknown aromatic	
		617	0.6	006	BQW	tetrachloro unknown aromatic	
		617	3	006	BQW	polycyclic bridged hydrocarbon	
		618	20	006	BQW	polycyclic bridged hydrocarbon	
		621	10	006	BQW	polycyclic bridged hydrocarbon	
		622	9	006	BQW	dieldrin isomer	
		624	0.6	006	BQW	unknown with 6 chlorines	
		625	2	006	BQW	unknown aromatic	
		626	20	006	BQW	DDT isomer	
		628	5	006	BQW		
		629	10	006	BQW		
		630	0.3	006	BQW		
		632	0.6	006	BQW	polycyclic bridged hydrocarbon	
		634	0.4	006	BQW	polycyclic bridged hydrocarbon	
		635	0.8	006	BQW	unknown alkane, C-25	
		636	0.4	006	BQW		
		637	0.3	006	BQW	tetrachloro cyclic hydrocarbon	
		637	0.4	006	BQW	unknown alkene or alcohol	
		638	0.4	006	BQW	unknown aromatic	
		639	0.4	006	BQW	mirex	
		644	2	006	BQW	hexachloro unknown aromatic	
MK2044	7.6-7.9	543	1	007	BQW	branched hydrocarbon, C-9	A
		544	6	007	BQW		
		547	0.6	007	BQW		
		548	5	007	BQW	hexachloroethane	
		551	3	007	BQW	branched hydrocarbon	
		553	6	007	BQW		
		558	2	007	BQW	trichlorobenzene	
		558	10	007	BQW	trichlorocyclopentene	
		560	2	007	BQW		
		561	20	007	BQW	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		562	2	007	BQW		
		563	9	007	BQW	trichlorocyclopentene	
		565	1	007	BQW		
		566	4	007	BQW	chlorinated cyclopentene	
		567	7	007	BQW	chlorinated methyl benzene	
		567	2	007	BQW		

A - No positive identification

C - Plasticizer

P - Low concentration

* - Values reported are blank corrected

Site CS-SP
4928A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 28 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
NRE044	7.6-7.9	569	20	007	BQM	tetrachloro cyclopentene	A
		569	30	007	BQM	tetrachloro benzene	A
		570	3	007	BQM		
		572	1	007	BQM		
		574	40	007	BQM	polyaromatic hydrocarbon, C-12	
		574	3	007	BQM	chlorinated hydrocarbon	
		576	80	007	BQM	1,1'-oxybisbenzene	
		576	1	007	BQM	hexachlorobutene	
		577	1	007	BQM		
		578	0.6	007	BQM	chlorinated alkyl benzene	A
		579	2	007	BQM	alpha lindane isomer	A
		580	1	007	BQM		A
		581	1	007	BQM		A
		582	2	007	BQM		
		582	1	007	BQM	lindane isomer	
		584	10	007	BQM	pentachlorobenzene	
		585	2	007	BQM	delta lindane isomer	
		588	10	007	BQM		A
		591	3	007	BQM	octachloro cyclopentadiene	
		593	0.4	007	BQM		A
		596	10	007	BQM	hexachlorinated hydrocarbon, C-6	
		597	0.4	007	BQM	trimethyl phenol	
		597	0.7	007	BQM		A
		598	0.9	007	BQM		A
		601	40	007	BQM	chlordene isomer	
		604	0.7	007	BQM		A
		605	1	007	BQM		A
		605	2	007	BQM		A
		606	10	007	BQM		A
		606	7	007	BQM	dichloropyridine	
		607	3	007	BQM		A
		609	4	007	BQM	dichloropyridine	
		609	8	007	BQM	unknown phthalate	
		611	20	007	BQM		A
		612	3	007	BQM	1,2,3,4-tetrachloro-1,3-cyclopentadiene	
		613	0.6	007	BQM		A
		614	0.8	007	BQM		A
		614	1	007	BQM	nonanedioic acid, dibutyl ester	D
		615	2	007	BQM		A
		616	0.9	007	BQM	1,2,3,4-tetrachloro-1,3-cyclopentadiene isomer	
		617	2	007	BQM		A
		618	20	007	BQM		A

A - No positive identification

D - Derived from natural products

* - Values reported are blank corrected

Site CS-SP

4928A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 29 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MK2044	7.6-7.9	618	1	007	BQW		A
		621	70	007	BQW		A
		622	9	007	BQW		A
		623	2	007	BQW		A
		624	0.7	007	BQW		A
		625	0.6	007	BQW		A
		626	9	007	BQW		A
		627	2	007	BQW		A
		627	4	007	BQW		A
		628	1	007	BQW		A
		630	0.7	007	BQW	unknown hexanedioic acid, diester	C, P
		631	3	007	BQW		A
		633	1	007	BQW	unknown hexanoic acid, diester	A
		634	0.6	007	BQW		A
		634	0.5	007	BQW	branched hydrocarbon, C-25	A
		636	1	007	BQW		A
		636	0.8	007	BQW		C, P
		637	0.5	007	BQW	unknown phthalate	A
		639	1	007	BQW		A
		639	0.9	007	BQW		A
		640	1	007	BQW		A
		641	0.8	007	BQW		A
		642	3	007	BQW	polychlorinated aromatic hydrocarbon	A
		643	0.6	007	BQW		A
		643	0.7	007	BQW		A
		644	7	007	BQW	halogenated hydrocarbon	A
		646	0.9	007	BQW		A
		649	0.4	007	BQW		A
MK2061	8.2-8.8	536	20	002	BQW	unknown benzene	
		540	20	002	BQW	unknown benzene	
		545	300	002	BQW	unknown methyl ester	
		546	10	002	BQW	unknown methyl ester	
		547	6	002	BQW		A
		548	300	002	BQW	unknown methyl ester	
		551	200	002	BQW	trimethyl decane isomer	
		552	10	002	BQW	polycyclichydrocarbon, C-10	
		552	10	002	BQW	alkane, C-11	A
		553	7	002	BQW		A
		553	20	002	BQW		
		553	40	002	BQW	unsaturated hydrocarbon, C-12	
		554	10	002	BQW	alkene, C-12	

A - No positive identification

C - Plasticizer

P - Low concentration

* - Values reported are blank corrected

Site CS-SP

4928A/1041A

Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 30 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MX2061	0.2-0.0	555	7	002	BQM	unknown benzene	A
		555	7	002	BQM		
		556	20	002	BQM	alkane, C-12	
		556	20	002	BQM	alkane, C-12	
		557	40	002	BQM	alkane, C-12	
		557	10	002	BQM	alkane, C-12	
		558	30	002	BQM	trichlorobenzene isomer	
		558	30	002	BQM	trichlorocyclopentene	
		558	7	002	BQM	unsaturated hydrocarbon, C-12	
		559	10	002	BQM	unknown cyclic hydrocarbon	
		560	100	002	BQM	alkane, C-12	
		561	30	002	BQM	alkane, C-12	
		561	40	002	BQM	1,1,2,3,4,4-hexachloro-1,3-butadiene	
		562	8	002	BQM		A
		563	10	002	BQM	unknown with 3 chlorines	
		564	20	002	BQM		A
		565	10	002	BQM	unsaturated hydrocarbon	
		565	30	002	BQM	alkane, C-13	
		566	30	002	BQM	bridged polycyclic hydrocarbon	
		568	70	002	BQM	alkane, C-13	
		568	10	002	BQM		A
		568	50	002	BQM	tetrachlorocyclopentene	
		570	30	002	BQM		A
		570	9	002	BQM		A
		571	10	002	BQM	cyclic hydrocarbon	
		572	40	002	BQM		A
		572	60	002	BQM		A
		573	6	002	BQM	alkane, C-14	
		573	20	002	BQM	alkane, C-14	
		574	70	002	BQM	unknown aromatic	
		574	9	002	BQM		A
		575	50	002	BQM	alkane, C-14	
		575	100	002	BQM	1,1'-oxybis benzene	
		576	4	002	BQM		A
		576	5	002	BQM		A
		577	4	002	BQM	dimethyl naphthalene	
		577	20	002	BQM	dichlorobenzene isomer	
		578	30	002	BQM		A
		579	50	002	BQM	alkane, C-15	
		580	8	002	BQM	alkane, C-15	
		580	7	002	BQM	alkane, C-15	
		582	70	002	BQM	alkane, C-15	
		582	6	002	BQM	unknown naphthalene	

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 31 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MXS061	8.2-8.8	583	4	002	BQM		A
		584	30	002	BQM	pentachloro benzene	
		585	4	002	BQM	alkane, C-16	A
		585	20	002	BQM		A
		586	20	002	BQM		A
		587	7	002	BQM	unknown aromatic	
		588	90	002	BQM	alkane, C-16	A
		589	20	002	BQM		A
		590	4	002	BQM		A
		591	20	002	BQM	alkane, C-17	
		592	6	002	BQM		A
		593	4	002	BQM	alkane, C-17	
		593	10	002	BQM	1,4-dichloro-2-(2-chloroethyl) benzene	
		594	40	002	BQM	alkane, C-17	
		595	40	002	BQM	alkane, C-17	
		596	30	002	BQM	hexachloro cyclic hydrocarbon	
		597	8	002	BQM	unknown phenol	
		598	80	002	BQM	unknown cyclic hydrocarbon	
		600	20	002	BQM	alkane, C-19	
		601	700	002	BQM	chlordene	A
		603	5	002	BQM		
		604	100	002	BQM	bicyclic bridged hydrocarbon	
		606	80	002	BQM	bicyclic bridged hydrocarbon	A
		606	5	002	BQM		
		609	6	002	BQM	bicyclic bridged hydrocarbon	A
		613	6	002	BQM		A
		615	5	002	BQM		A
		616	8	002	BQM	hydrocarbon, C-22	
		617	5	002	BQM	DDMU	
		618	4	002	BQM	akton	
		620	10	002	BQM		A
		622	20	002	BQM	DDD isomer	
		624	20	002	BQM	hexachloro bridged polycyclic hydrocarbon	A
		625	20	002	BQM		
		625	30	002	BQM	DDD isomer	
		626	80	002	BQM	DDT isomer	
		627	40	002	BQM	hexachloro bridged polycyclic	A
		627	60	002	BQM	hydrocarbon	
		627	20	002	BQM		A

A - No positive identification
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 32 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
ME061	8.2-8.8	628	9	002	BQM	bridged polycyclic hydrocarbon	A
		628	10	002	BQM	hexachloro bridged polycyclic hydrocarbon	A
		629	80	002	BQM	DDT isomer	A
		630	70	002	BQM		A
		631	100	002	BQM		A
		632	100	002	BQM		A
		632	20	002	BQM		A
		633	30	002	BQM		A
		634	40	002	BQM		A
		634	20	002	BQM		A
		636	4	002	BQM		A
		637	4	002	BQM		A
		640	10	002	BQM		A
		641	20	002	BQM		A
		642	20	002	BQM		A
		643	30	002	BQM		A
		644	80	002	BQM		A
		645	30	002	BQM		A
		645	6	002	BQM		A
		646	6	002	BQM		A
		646	8	002	BQM		A
		650	4	002	BQM		A
ME062	8.2-9.2	544	30	003	BQM	trimethyl benzene isomer	
		548	4	003	BQM	unknown hydrocarbon, C-10	
		550	10	003	BQM	cyclo hydrocarbon, about C-10	
		551	20	003	BQM	trimethyl hydrocarbon isomer	
		554	4	003	BQM	unknown alkene or alcohol	
		554	5	003	BQM	unknown cyclic hydrocarbon	
		560	6	003	BQM	unknown hydrocarbon, C-11	
		561	20	003	BQM	hydrocarbon with 6 chlorines	
		563	6	003	BQM	unknown cyclic hydrocarbon	
		564	5	003	BQM	alkene, C-12	
		565	10	003	BQM	unknown cyclic hydrocarbon	
		566	200	003	BQM	unknown with 1 bromine	
		568	4	003	BQM		A
		576	9	003	BQM	trichlorobenzene isomer	
		577	6	003	BQM	trichloro aromatic	
		583	5	003	BQM	unknown aromatic	
		599	10	003	BQM	unknown hydrocarbon with 4 bromines	
		601	50	003	BQM	chlordene	
		604	5	003	BQM	unknown with 3 chlorines	
		606	4	003	BQM	unknown with 2 chlorines	

A - No positive identification
* - Values reported are blank corrected

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 33 of 35.

Borehole Number	Interval Depth (ft.)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MR2062	8.2-9.2	607	60	003	BQW	unknown with 3 chlorines	A
		608	4	003	BQW		
		610	20	003	BQW	unknown with 2 chlorines	
		613	6	003	BQW	cyclic hydrocarbon	A
		615	5	003	BQW	unknown aromatic	
		625	4	003	BQW	isomer of isodrin	
		626	5	003	BQW		A
		628	3	003	BQW	bridged polycyclic hydrocarbon	
		632	5	003	BQW	bridged polycyclic hexachloro hydrocarbon	
		636	10	003	BQW		A
		640	20	003	BQW		
		642	4	003	BQW		
MR2063	8.6-9.2	537	7	004	BQW	alkylated benzene, C-9	A
		538	2	004	BQW	alkylated benzene, C-9	
		538	2	004	BQW	alkylated benzene, C-9	
		540	1	004	BQW	cyclic hydrocarbon, C-10	A
		541	4	004	BQW	alkylated benzene, C-9	
		542	10	004	BQW	hydrocarbon, C-3, with 2 chlorines	
		544	6	004	BQW	alkylated benzene, C-9	A
		551	10	004	BQW	branched hydrocarbon, C-11	
		560	3	004	BQW	branched hydrocarbon, C-11	
		561	10	004	BQW	1,1,2,3,4,4-hexachloro-1,3-butadiene	A
		566	20	004	BQW	bromohexene	
		567	2	004	BQW		
		568	0.4	004	BQW		A
		574	1	004	BQW	tetrachlorobenzene	
		584	4	004	BQW	ester, mw GT 180	
		589	0.4	004	BQW	substituted benzothiazole	A
		591	0.7	004	BQW	hydrocarbon, C-17	
		598	3	004	BQW	3,3,4,4-tetrabromohexane	
		599	2	004	BQW	3,3,4,4-tetrabromohexane	A
		601	10	004	BQW	chlordene	
		604	3	004	BQW		
		605	2	004	BQW		A
		606	9	004	BQW	dichloropyridine	
		606	2	004	BQW	chlorinated hydrocarbon	
		607	30	004	BQW	chlorinated pyridine	A
		608	1	004	BQW		
		609	2	004	BQW	aldrin-R	
		614	30	004	BQW	isodrin	A
		614	10	004	BQW	isodrin	

A - No positive identification

GT - Greater than

* - Values reported are blank corrected

Site CS-SP
4928A/1041A
Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 14 of 35.

Borehole Number	Interval		Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
	Depth (ft)							
MKR063	8.6-9.2		615	2	004	BQM	1-chloro-4-chlorophenylmethyl benzene	
			621	6	004	BQM	dieldrin isomer	A
			626	4	004	BQM		
			627	0.5	004	BQM	branched hydrocarbon, C-24	
			628	10	004	BQM	branched hydrocarbon, C-24	
			628	5	004	BQM	cyclic hydrocarbon, C-24	
			630	1	004	BQM	cyclic hydrocarbon, C-24	
			630	0.4	004	BQM		A
			631	3	004	BQM	chlorinated hydrocarbon	
			631	6	004	BQM	chlorinated hydrocarbon	
			633	0.5	004	BQM		A
			633	0.8	004	BQM	endrin ketone	
			634	0.7	004	BQM	isodrin derivative	
			635	1	004	BQM		A
			636	1	004	BQM		A
			636	0.9	004	BQM	phthalate ester	C, P
			637	1	004	BQM		A
			637	2	004	BQM		A
			637	1	004	BQM	dichlorinated pyridine	A
			637	2	004	BQM		A
			638	2	004	BQM		A
MKR071	5.7-6.4		639	5	004	BQM		A
			640	1	004	BQM	dichlorinated pyridine	A
			641	4	004	BQM	dichlorinated pyridine	A
			642	7	004	BQM		A
			643	0.6	004	BQM		A
			645	8	004	BQM		A
			650	1	004	BQM	branched hydrocarbon, C-26	
			637	0.5	008	BRD	bis(2-ethylhexyl) phthalate	C, P
					009	BRD		K
					010	BRD		K
MKR191	3.6-4.4		636	0.4	004	BRC	branched hydrocarbon, C-25	
			609	0.8	005	BRC	unknown phthalate	C, P
			621	1	005	BRC	hexadecanoic acid, diester	D

A - No positive identification
 C - Plasticizer
 D - Derived from natural products
 P - Low concentration
 K - None detected
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Table CS-SP-11. Tentative Identification of Nontarget Compounds. Page 35 of 35.

Borehole Number	Interval Depth (ft)	Unknown Number	Concentration (ppm)*	Sample Number	Lot	Best-fit Identification	Comments
MKE193	3.4-4.2	609	0.7	006	BRC	unknown phthalate	C, P
MKE201	4.2-4.8	576	5	005	BQX	trichlorobenzeneamine	A
		578	5	005	BQX		A
		609	0.7	005	BQX		
		636	0.8	005	BQX	branched hydrocarbon, C-25	
		648	0.7	005	BQX		A
MKE202	4.0-4.5	576	4	006	BQX		A
		578	5	006	BQX		A
		610	3	006	BQX	unknown phthalate	C, P
		621	3	006	BQX		A
		636	0.5	006	BQX		A
		637	0.5	006	BQX	unknown phthalate	C, P
		647	0.4	006	BQX		A
MKE203	4.2-5.0	576	10	007	BQX	trichlorobenzeneamine	A
		578	10	007	BQX		C, P
		609	1	007	BQX	unknown phthalate	A
		621	0.8	007	BQX		
		636	0.7	007	BQX	branched hydrocarbon, C-25	C, P
		637	0.4	007	BQX	unknown phthalate	A
		647	0.4	007	BQX		
MKE211	8.0-9.0			002	BQY		K
MKE212	7.8-9.0	609	0.3	003	BQY	hexadecanoic acid	D

A - No positive identification
 C - Plasticizer
 D - Derived from natural products
 P - Low concentration
 K - None detected
 * - Values reported are blank corrected

Site CS-SP
 4928A/1041A
 Rev. 7/01/88

Zinc was found in all intervals at concentrations ranging from 85 to 99 ug/g. Copper was found in four samples at 34 to 42 ug/g. Arsenic was detected in the uppermost samples, ranging from 12 to 300 ug/g. Cadmium and chromium were above their indicator ranges in the 8.0 to 9.0 ft interval at 10 ug/g, and 45 ug/g, respectively. Lead was within its indicator range at 25 ug/g in the 8.0 to 9.0 ft and 17.0 to 18.0 ft intervals.

Several halogenated and nonhalogenated nontarget compounds were tentatively identified in this boring. Nonhalogenated hydrocarbons detected had a maximum concentration of 1 ppm. In the 27.0 to 28.0 ft interval, an isomer of aldrin was tentatively identified at 100 ppm. A dichlorinated organo phosphoric acid was tentatively identified at 1 ppm in the 17.0 to 18.0 ft interval. This compound is possibly related to organo phosphate pesticides and was detected in the same interval as parathion.

Manhole W25

Elevated levels of 26 compounds were detected in samples from Manhole W25 (Figure CS-SP-6a). The uppermost interval (6.9-7.9 ft) contained all 26 of these compounds. All compounds except chloroform, methylene chloride, copper and zinc showed rapidly decreasing concentrations with increasing depth. Chloroform, chromium, copper, lead and zinc were the only analytes detected in the third, fourth, and fifth intervals (16.2-17.2, 21.2-22.1, and 26.2-27.2 ft). Samples from the first two intervals (6.9-7.9 and 11.8-12.8 ft) contained the following volatile organic compounds: 1,1,2-trichloroethane (20 and 1 ug/g), bicycloheptadiene (20 and 8 ug/g), carbon tetrachloride (20 and 4 ug/g), chloroform (400 and 6 ug/g), chlorobenzene (20 ug/g), dibromochloropropane (6,000 and 2,000 ug/g), ethylbenzene (20 ug/g), m-xylene (100 and 1 ug/g), methylene chloride (6 and 9 ug/g), o- and p-xylene (40 ug/g), tetrachloroethylene (40 and 5 ug/g), and toluene (300 and 7 ug/g). Semivolatile organic compounds detected in the first two intervals included aldrin (10,000 and 200 ug/g), dibromochloropropane (10,000 and 80 ug/g), dichlorodiphenyltrichloroethane (DDT) (70 and 5 ug/g), dieldrin (100 ug/g), hexachlorocyclopentadiene (90 ug/g), and isodrin (300 ug/g). The third, fourth, and fifth intervals yielded only one volatile compound, chloroform at 1 ug/g in the 26.2 to 27.2 ft interval, and no semivolatile compounds.

Cadmium, copper, zinc, arsenic, and mercury were all within or above their indicator ranges in samples from Boring W25. Cadmium was above its indicator range in the first interval under the manhole (6.9 to 7.9 ft) at 5.0 ug/g. Copper was found slightly above its indicator range in the first four sampling intervals at concentrations of 37 to 43 ug/g, and within its indicator range in the last sampling interval at a concentration of 26 ug/g. Zinc was above its indicator range in all five samples, with concentrations of 85 to 110 ug/g. Arsenic was found at 130 ug/g in the first sampling interval, well above its indicator range. Mercury was found in the first two sampling intervals at concentrations of 8.8 ug/g (6.9 to 7.9 ft) and 0.065 ug/g (11.8 to 12.8 ft).

Thiodiglycol and chloroacetic acid were detected in the first sampling interval (6.9 to 7.9 ft) at 14 ug/g and 230 ug/g, respectively. These compounds were not detected in any of the other samples.

Several nontarget compounds were tentatively identified in the GC/MS scan in the 6.9 to 7.9 and 11.8 to 12.8 ft intervals. The compounds included dichloropropene (900 and 40 ppm), unknowns with 3 chlorines (700 and 300 ppm), 1,3,5-trimethyl benzene (300 ppm), and several other halogenated compounds at concentrations ranging from 2 to 90 ppm. Also present in samples from Manhole W27 were compounds tentatively identified as hexadecanoic acid, nonanedioic acid, and dibutyl ester at concentrations of 0.7 ppm or less.

Manhole W27

In Manhole W27 (Figure CS-SP-6a), 22 pesticides, solvents, process intermediates, metals, and breakdown products were above their indicator levels. In general, the three uppermost samples beneath the manhole (6.5-7.5, 11.5-12.5, and 16.2-17.2 ft intervals) contained more detectable analytes and higher concentrations of analytes than the two deeper intervals. Many nontarget halogenated and nonhalogenated compounds also were tentatively identified in the boring, generally decreasing in number and concentration with depth.

Seven volatile compounds were detected in at least three of the samples, including: bicycloheptadiene (1-30 ug/g), carbon tetrachloride (2-20 ug/g),

chloroform (5-10 ug/g), methylene chloride (2-3 ug/g), tetrachloroethylene (.9-10 ug/g), and toluene (1-50 ug/g). Dibromochloropropane was detected in the volatile analysis at concentrations that ranged from 30 to 400 ug/g and in the semivolatile analysis at 9 to 100 ug/g. The 11.5 to 12.5 ft interval contained benzene at 1 ug/g. Concentrations of aldrin, detected in four samples, ranged from 7 to 100 ug/g. Other semivolatile compounds detected were: chlorophenylmethyl sulfone in one sample (0.3 ug/g), dichlorodiphenylethane (DDE) in one sample (2 ug/g), dichlorodiphenyltrichloroethane (DDT) in three samples (0.8-30 ug/g), dieldrin in three samples (1-90 ug/g), hexachlorocyclopentadiene in two samples (0.7 and 0.8 ug/g), isodrin in two samples (3 and 6 ug/g), and suona in two samples (0.7 and 2 ug/g).

Copper and zinc were above their indicator ranges in all samples at concentrations ranging from 36 to 41 ug/g and 84 to 130 ug/g, respectively. Chromium and lead were above their indicator ranges in one sample each. Chromium was found at 72 ug/g in the 16.2 to 17.2 ft interval and lead was found at 49 ug/g in the 6.5 to 7.5 ft interval. Arsenic was found in the 6.5 to 7.5 ft interval at 15 ug/g, and mercury was found in the two uppermost samples at 2.0 and .061 ug/g.

The number of nontarget compounds tentatively identified in this boring decreases significantly with depth. In the 6.5 to 7.5 interval, 17 nonhalogenated compounds were tentatively identified at concentrations less than or equal to 3.0 ppm, and 41 halogenated compounds were tentatively identified with a maximum concentration of 50 ppm. The 11.5 to 12.5 ft interval contained 4 nonhalogenated and 6 halogenated compounds at concentrations ranging from 0.4 to 1 ppm and 0.4 to 20 ppm, respectively. No nonhalogenated hydrocarbons were tentatively identified beneath this sample. A total of 8 halogenated compounds were tentatively identified in the three deepest samples with a maximum concentration of 6 ppm. Also present in the three deepest samples were naturally occurring acids and esters at low concentrations.

Manhole 4-3

In Manhole 4-3 (Figure CS-SP-6a), methylene chloride, trichloroethylene, aldrin, zinc, and copper were within or above their indicator levels. Methylene chloride was found at 1 ug/g in the three uppermost samples, trichloroethylene was found at 0.6 ug/g in the 8.2 to 9.2 ft interval, and aldrin was detected at 2 ug/g in the 3.2 to 4.2 ft interval. Zinc was within its indicator range in the 17.2 to 18.2 and 22.2 to 23.2 ft intervals at 72 and 73 ug/g, respectively, and was above its indicator range in the 12.2 to 13.2 ft interval at 82 ug/g. Copper was found at 20 ug/g in the 17.2 to 18.2 ft interval.

Two nontarget compounds were tentatively identified in the 17.2 to 18.2 ft interval -- bromodichloromethane (9 ppm) and an alkylated phenol (0.4 ppm).

Manhole 6-1

Samples from Manhole 6-1 (Figure CS-SP-6a) contained 1,1,1-trichloroethane, 1,1,2-trichloroethane, carbon tetrachloride, tetrachloroethylene, copper, lead, and zinc within or above their indicator levels. The second sampling interval (17.5 to 18.5 ft) contained 0.8 ug/g of 1,1,2-trichloroethane. In the 23.5 to 24.5 ft interval, 1,1,1-trichloroethane, carbon tetrachloride, and tetrachloroethylene were detected at 0.5 ug/g, 0.6 ug/g, and 1 ug/g, respectively. Copper and zinc were above their indicator ranges in the 12.5 to 13.5, 17.5 to 18.5, and 23.5 to 24.5 ft intervals at concentrations that ranged from 42 to 47 ug/g and 85 to 110 ug/g, respectively. The 29.0 to 30.0 ft interval contained copper at 30 ug/g and zinc at 80 ug/g. Lead was within its indicator range at 36 ug/g in the 12.5 to 13.5 ft interval.

No nontarget compounds of note were tentatively identified in samples collected from below Manhole 6-1. Some naturally occurring acids and esters were tentatively identified at concentrations of 2 ppm or less.

Trench CS01

In Trench CS01 (Figure CS-SP-6b), dieldrin was detected in Borings 2 through 7, and in Boring 11 in the 4.0 to 5.0 ft interval (directly beneath pipe

joints) at concentrations ranging from 0.3 ug/g to 2 ug/g. It was also detected in the composite grab sample (Sample 10) at 5 ug/g.

Tetrachloroethylene was detected directly beneath the pipe in Borings 1, 4, 5, 6, and 7 at concentrations ranging from 0.5 to 6 ug/g and in Boring 8 in the second interval at 3 ug/g.

Methylene chloride was found in Borings 1, 6, and 7, all at 2 ug/g, and aldrin was detected in Borings 4 and 11 at 0.4 and 1 ug/g, respectively. Copper was found in all samples from Borings 1 through 10 within or above its indicator range at concentrations ranging from 29 to 51 ug/g. Grab Sample 10 contained chromium above its indicator range at 64 ug/g and lead within its indicator range at 39 ug/g. Zinc was within its indicator range in the 8.0 to 9.0, 13.0 to 14.0, and 22.0 to 23.0 ft intervals of Boring 9 at 76, 73, and 73 ug/g, respectively. In all other samples in the trench, zinc was above its indicator range, with a maximum concentration of 820 ug/g in the composite grab sample (Sample 10). Arsenic was found directly under the pipe in Borings 1 through 8 and in Grab Sample 10 at concentrations ranging from 5.3 to 24 ug/g. Mercury was found in Borings 1, 4, 5, 6, 7, and 10 at concentrations ranging from 0.075 to 2.3 ug/g.

Several halogenated nontarget compounds were tentatively identified in Borings 2 through 7 and 11, which are located directly beneath the pipe. The highest concentration, 20 ppm, occurred in Boring 6 for a compound tentatively identified as 2-[(4-chloro-6-(ethylamino)-1,3,5-triazine-2-yl)amino]-2-methyl propanenitrile. In Boring 8, the 4.0 to 5.0 and 8.0 to 9.0 ft intervals contained a few halogenated compounds with maximum concentrations of 9 ppm, and a nonhalogenated hydrocarbon with a maximum concentration of 0.8 ppm. Nontarget compounds of note tentatively identified in Boring 9 were halogenated organic compounds at 1 ppm each in the 8.0 to 9.0 and 18.0 to 19.0 ft intervals. The composite grab sample (10) contained two chlorinated hydrocarbons (20 and 40 ppm) and an unknown aromatic at a concentration of 80 ppm.

Soil gradation analysis of the physical sample from Boring 12 showed a high percentage by weight of fines in the bedding material (Figures CS-SP-5a and 5b). Silt or clay constituted 50 to 60 percent, fine sand 30 percent, and medium to coarse grained sand 10 to 20 percent, indicating that native material was used for bedding. Though this material was well compacted, the overall foundation for the pipes appeared adequate but not of high quality. Calculations for the structural stability of the pipe are included in Appendix CS-C.

Trench CS02

Ten samples were collected from Trench CS02, 8 from the 7.8 to 8.8 ft interval, and two from the 11.8 to 12.8 ft interval (Figure CS-SP-6c). Analyte concentrations did not decrease with either depth or horizontal distance from the pipe. More than half of the samples contained bicycloheptadiene (0.9-70 ug/g), carbon tetrachloride (5-200 ug/g), chloroform (2-50 ug/g), m-xylene (0.9-10 ug/g), tetrachloroethylene (2-90 ug/g), toluene (0.4-300 ug/g), aldrin (3-40,000 ug/g), isodrin (20-1000 ug/g), copper (34 ug/g, maximum), zinc (99 ug/g, maximum), arsenic (10-80 ug/g), and mercury (0.057-1.3 ug/g).

Dibromochloropropane was detected in nine samples in the volatile analysis (60-7000 ug/g) and in seven samples in the semivolatile analysis (0.4-20,000 ug/g). Dicyclopentadiene was detected once in the volatile analysis at 2 ug/g in Boring 7 and once in the semivolatile analysis at 8 ug/g in Boring 4. Benzene, o- and p-xylene, and ethylbenzene were detected only in saturated samples at the water table at concentrations equal to or less than 9 ug/g; and chlorobenzene was detected in Boring 1 (20 ug/g) and Boring 4 (2 ug/g) and in the 11.8 to 12.8 ft intervals of Borings 7 and 8 at 4 ug/g.

In samples from directly beneath pipe joints, dichlorodiphenyltrichloroethane (DDT) was detected twice at concentrations ranging from 2 to 500 ug/g, dieldrin was detected four times between 6 and 200 ug/g, and hexachlorocyclopentadiene was detected three times at levels between 50 and 500 ug/g. Supona was detected in Boring 4 at 2 ug/g.

Cadmium, copper, lead, zinc, arsenic, and mercury were found within or above their indicator ranges. Cadmium was found only once, in Boring 2 at 1.3 ug/g. Copper was within its indicator range in Borings 2, 4, 6, 7, and 8 at concentrations of 24 to 34 ug/g. Lead was found in four samples from Borings 1, 3, 5, and 6 at concentrations of 59 to 79 ug/g. Zinc was found within its indicator range in three samples from Borings 7 and 8 (67 to 77 ug/g) and above its indicator range in Borings 2 and 6 (99 and 90 ug/g). Arsenic was found above its indicator range in Borings 1, 2, 3, 4, and 7 at concentrations of 11 to 80 ug/g. Mercury was above its indicator range in all samples except those from Boring 8, where it was found once within its indicator range at 0.057 ug/g (11.8-12.8 ft). Elevated concentrations of mercury ranged from 0.19 to 1.3 ug/g.

In addition, numerous nontarget compounds were tentatively identified in the GC/MS scan. Both hydrocarbons and halogenated organic compounds tentatively were identified in all but 3 borings (Borings 2, 5, and 6 contained only halogenated organic compounds). Concentrations of halogenated compounds ranged from 2 to 500 ppm and included isomers of aldrin, endrin, isodrin, and dibromochloropropane. Hydrocarbons were tentatively identified at concentrations ranging from 3 to 700 ppm. The highest concentrations of both types of compounds were detected in the 11.8 to 12.8 ft interval of Boring 7, including an unsaturated acyclic hydrocarbon (700 ppm), an unknown aromatic (400 ppm), and an isomer of bromochloropropane (500 ppm).

Analysis of soil gradation (Figures CS-SP-5c and 5d) shows that the bedding material is composed of 40 to 60 percent silt or clay, 30 to 40 percent fine grained sand, and 10 to 30 percent medium to coarse grained sand or gravel. The high percentage of fines indicates that native material was used for the pipe foundation. Calculations (Appendix CS-C) for the structural stability of the pipe under worst trench earth loading conditions and for poor Class D bedding in accordance with ASTM C12-82 (ASTM, 1986) show that the pipe was designed properly. However, longitudinal cracks seen on the pipe section between Joints 3 and 4 indicated a structural failure, possibly caused by inadequate compaction of material under the haunches of the pipe.

Trench CS03

Chloroform, carbon tetrachloride, tetrachloroethylene, 1,2-dichloroethane, dieldrin, hexachlorocyclopentadiene, copper, lead, zinc, arsenic, and mercury were within or above their indicator levels in Trench CS03 (Figure CS-SP-6d).

Hexachlorocyclopentadiene was detected in Borings 1, 2, 3, and 4 at 3,000 ug/g, 4,000 ug/g, 300 ug/g, and 2,000 ug/g, respectively. Boring 4 contained other organic compounds including carbon tetrachloride (3 ug/g), chloroform (2 ug/g), tetrachloroethylene (10 ug/g), 1,2-dichloroethane (40 ug/g), and dieldrin (1 ug/g). Carbon tetrachloride was detected at 9 ug/g in Boring 2, and tetrachloroethylene was detected at 3 ug/g in Borings 1 and 2.

Copper and zinc were within and above their indicator ranges in ten and twelve samples, respectively, with maximum concentrations of 46 and 100 ug/g, respectively. Lead was detected at 640 ug/g in Boring 1 and 150 ug/g in Boring 2. Arsenic was found within its indicator range in 5 samples. Mercury was found within its indicator range in 3 samples and above its indicator range (0.020 ug/g) in Boring 6.

In the GC/MS scan, many halogenated nontarget organic compounds were tentatively identified in Borings 1 through 6 at concentrations that ranged from 2 to 300 ug/g. The compounds included isomers or metabolites of aldrin and isodrin (Boring 4) and chlordene (Boring 2). Two alkenes were tentatively identified in Boring 7 at low concentrations (0.3 and 0.4 ppm).

Analysis of soil gradation (Figures CS-SP-5e, 5f, 5g, and 5h) shows the bedding material to consist of 10 to 20 percent coarse to medium sand and gravel, 30 to 60 percent fine sand, and 20 to 60 percent silt or clay, which indicates that native material was used for the pipe foundation. Calculations for the structural stability of the pipe (Appendix CS-C) under worst trench earth loading conditions and for poor Class D bedding in accordance with ASTM C12-82 (ASTM, 1986) show a marginal factor of safety, primarily due to the depth of backfill above the pipe. The safety factor combined with possibly inadequate compaction of the backfill material beneath the haunches of the pipe may explain the structural failure (the longitudinal cracking) of the pipe.

Trench MKE 2

Samples were collected from beneath three pipe joints in Trench MKE 2 (Figure CS-SP-6e). These samples contained elevated levels of pesticides, herbicides, process intermediates, and metals. Semivolatile organic compounds detected in at least two of the three samples include dichlorodiphenyltrichloroethane (DDT) (7 to 30 ug/g), aldrin (100 ug/g in all three samples), atrazine (10 ug/g), dieldrin (10 to 70 ug/g), hexachlorocyclopentadiene (30 and 1 ug/g), isodrin (10 to 30 ug/g), parathion (20 ug/g), supona (30 and 30 ug/g), and dibromochloropropane (80 and 100 ug/g). A separate analysis for dibromochloropropane showed this compound to be present in all three borings at concentrations ranging from 370 to 32,000 ug/g. Parathion was detected in Boring 2 at 20 ug/g.

Cadmium, copper, lead, zinc, arsenic, and mercury were within or above their indicator ranges in all three borings. Concentrations of arsenic ranged from 130 to 190 ug/g, cadmium from 4.2 to 5.8 ug/g, copper from 55 to 1,500 ug/g, lead from 38 to 89 ug/g, zinc from 86 to 230 ug/g, and mercury from 0.7 to 4.7 ug/g.

Numerous nontarget hydrocarbons and halogenated organics were tentatively identified in each of the samples at concentrations ranging from 0.4 to 90 ppm and 0.4 to 2,000 ppm, respectively. Organophosphorous pesticides were tentatively identified from 2 to 70 ppm and an isomer of chlordene at 9 ppm in Boring 3.

Trench MKE 3

Two samples were collected from Trench MKE 3 at locations directly underneath Joints 1 and 3 (Figure CS-SP-6f). Semivolatile compounds found in both samples included aldrin (100 and 100 ug/g), dibromochloropropane (70 and 9 ug/g), dieldrin (100 and 20 ug/g), isodrin (30 and 30 ug/g), and supona (4 and 2 ug/g). In addition, Boring 1 contained atrazine (4 ug/g), dichlorodiphenylethane (4 ug/g), and dichlorodiphenyltrichloroethane (30 ug/g). Dibromochloropropane was also detected in a separate analysis at 95 and 13 ug/g.

Results from the metals analysis showed that Boring 1 contained elevated levels of cadmium (3.1 ug/g), arsenic (150 ug/g), and mercury (0.58 ug/g).

Boring 3 contained elevated levels of cadmium (2.8 ug/g), copper (75 ug/g), zinc (83 ug/g), and mercury (0.27 ug/g).

Numerous nontarget compounds were tentatively identified as hydrocarbons, chlorinated hydrocarbons, and chlorinated pesticides. The hydrocarbons primarily were branched, ranged in size from 11 to 19 carbons, and were present in concentrations from 3 to 30 ppm. The chlorinated hydrocarbons and pesticides included chlordene and isomers of dichlorodiphenyltrichloroethane (DDT) and dichlorodipenyldichloroethane (DDD) and hexachlorobutadiene. Concentrations of these nontarget compounds ranged from 4 to 100 ppm.

Trench MKE 4

Trench MKE 4 yielded three samples that were collected from directly under Joints 1, 2 and 3 (Figure CS-SP-6g). Semivolatile analyses showed the presence of pesticides and halogenated hydrocarbons at concentrations up to 540 ug/g. Of interest are aldrin (20 and 20 ug/g), dibromochloropropane (20 to 200 ug/g), dichlorodiphenylethane (0.8 and 2 ug/g), dichlorodiphenyltrichloroethane (10 to 40 ug/g), dieldrin (2 to 30 ug/g), hexachlorocyclopentadiene (20 and 30 ug/g), isodrin (1 to 40 ug/g), and supona (20 and 2 ug/g). A separate analysis showed dibromochloropropane at 540, 70, and 60 ug/g.

Elevated levels of arsenic were found in all three borings at concentrations from 120 to 170 ug/g. Cadmium, copper, zinc, and mercury were all present at concentrations within or above their indicator ranges. Maximum concentrations were 7.7 ug/g for cadmium, 42 ug/g for copper, 2.2 ug/g for mercury, and 100 ug/g for zinc.

Many nontarget halogenated organics, hydrocarbons, and aromatics were tentatively identified in each of the samples at concentrations ranging from 0.4 to 80 ppm. Of particular interest are compounds tentatively identified as isomers of isodrin (1, 2, and 5 ppm), dichlorodiphenyltrichloroethane (DDT) (4 and 20 ppm), aldrin (1, 2, and 300 ppm), dieldrin (9 ppm), and chlordene (0.6 to 40 ppm).

Trench MKE 6

Three samples were recovered from Trench MKE 6, all collected from beneath joints in the pipe (Figure CS-SP-6h). Semivolatile organic analysis revealed elevated levels of pesticides and halogenated hydrocarbons in the samples, including aldrin (200, 300, and 600 ug/g), dibromochloropropane (50 to 300 ug/g), dichlorodiphenylethane (7 ug/g), dieldrin (40 and 10 ug/g), isodrin (20, 20 and 40 ug/g), and supona (8 ug/g). Dibromochloropropane was found at 440, 260, and 55 ug/g in a separate analysis.

Elevated levels of arsenic were found in all three borings at concentrations of 740, 600, and 250 ug/g. Cadmium, copper, lead, zinc, arsenic, and mercury were all present at concentrations above their indicator ranges. Maximum concentrations were 34 ug/g for cadmium, 150 ug/g for copper, 97 ug/g for lead, 480 ug/g for zinc, 740 ug/g for arsenic, and 8.6 ug/g for mercury.

Nontarget compounds included those tentatively identified as hydrocarbons, ranging in size from 10 to 26 carbons, pesticides and their isomers, and brominated hydrocarbons. Maximum values are 300 ppm for methyl ester, 200 ppm for the brominated hydrocarbon, 100 ppm for the hydrocarbons, 700 for chlordene, and 80 for an isomer of dichlorodiphenyltrichloroethane (DDT). Aldrin, isodrin and an isomer of dieldrin were also tentatively identified at maximum concentrations of 2, 30, and 6 ppm, respectively.

Trench MKE 7

Three samples were collected from beneath joints in Trench MKE 7 (Figure CS-SP-6i). No target analytes were detected within or above their indicator levels in any of the samples. One nontarget compound, tentatively identified as bis(2-ethylhexyl)phthalate, was detected in Boring 1 at a low concentration (0.5 ppm).

Trench MKE 19

Three samples were collected in Trench MKE 19 (Figure CS-SP-6j), and several metals were detected within or above their indicator ranges in all samples. Concentrations ranged from 41 to 71 ug/g for copper, 85 to 97 ug/g for zinc,

5.1 to 14 ug/g for arsenic, and 0.18 to 5.4 ug/g for mercury. No nontarget compounds of note were detected.

Trench MKE 20

In Trench MKE 20 (Figure CS-SP-6k) three samples were collected from beneath pipe joints. Aldrin, dibromochloropropane, and dieldrin were each detected in one sample at 0.6, 0.6, and 0.3 ug/g, respectively. Copper, lead, and zinc were within or above their indicator ranges in all three samples.

Concentrations ranged from 32 to 80 ug/g for copper, 29 to 56 ug/g for lead, and 150 to 760 ug/g for zinc. Arsenic was within its indicator range in Borings 1 and 3 at 4.4 and 3.4 ug/g, and mercury was found above its indicator range at 0.17 and 0.13 ug/g in the same borings.

Several nontarget compounds were tentatively identified in borings from Trench MKE 20. Trichlorobenzamine was found in Borings 1 and 3 at 5 ppm and 10 ppm, respectively, and a branched hydrocarbon was tentatively identified at low concentrations in the same borings.

Trench MKE 21

Two samples were collected from Trench MKE 21 (Figure CS-SP-6l). Lead and zinc were detected within their indicator ranges in Boring 1 at 28 ug/g and 68 ug/g, respectively. No nontarget compounds of note were detected in this trench.

3.2.5 Contamination Assessment

The chemical sewer in the South Plants manufacturing complex was installed to carry liquid chemical wastes from the manufacturing areas to the waste disposal basins. Therefore, this portion of the chemical sewer was exposed to large quantities of chemicals manufactured and used in the South Plants manufacturing complex. The system was constructed primarily with oakum cement joints, which were not designed to be water tight, and some leakage is to be expected; however, as the sewer line deteriorated with age, considerable exfiltration may have occurred. In samples from manholes and trenches along

the chemical sewer in South Plants the following compounds were detected within or above their indicator levels:

1,2-Dichloroethane	Dichlorodiphenylethane
1,1,1-Trichloroethane	Dichlorodiphenyltrichloroethane
1,1,2-Trichloroethane	Dieldrin
Benzene	Hexachlorocyclopentadiene
Bicycloheptadiene	Isodrin
Carbon tetrachloride	Parathion
Chloroform	Supona
Ethylbenzene	Dibromochloropropane
m-Xylene	Dicyclopentadiene
Methylene chloride	Cadmium
Methylisobutyl ketone	Chromium
o- and p-Xylene	Copper
Tetrachloroethylene	Lead
Toluene	Zinc
Trichloroethylene	Arsenic
Aldrin	Mercury
Atrazine	Thiodiglycol
Chlorophenylmethyl sulfone	Chloroacetic Acid
Chlorobenzene	

Several hundred nontarget compounds were tentatively identified. These are not listed separately here but have been grouped into four main categories: halogenated hydrocarbons, nonhalogenated hydrocarbons, organophosphorous compounds, and naturally occurring compounds.

The following discussion begins at the farthest upstream location and follows the sewer in the direction of flow. Because of the wide variety and high concentrations of compounds detected, this contamination assessment will be used to indicate potential contaminant migration patterns around the sewer lines. The trench study areas provided an indication of the horizontal and vertical gradients of potential contaminants. Data collected from beneath

manholes will be used to verify the vertical extent of potential contaminant migration. As data collected from the MKE trenches by both MKE and Ebasco are limited to a maximum depth of 3 ft below the pipe, these data will be used to support other data and to correlate areas where potential contamination can be expected.

Trench MKE 19

Trench MKE 19 was dug along an abandoned portion of the chemical sewer. It is located at the far upstream end of the sewer line that extends toward the aldrin area, although at this point its only connection was to the mustard and dichlor decontamination pit. No semivolatile target compounds were detected in any of the three Ebasco samples collected at this excavation. Each sample contained copper, zinc, arsenic, and mercury at levels above their indicator ranges. No nontarget compounds of note were detected.

Samples collected from Trench MKE 19 by MKE contained elevated levels of methylene chloride, arsenic, and mercury. The methylene chloride was present in a fairly narrow concentration range (2.7 to 4.1 ug/g) and appeared in all samples, which may be an indication of laboratory background. The elevated levels of arsenic, and particularly mercury, were much higher directly under the pipe than beside the pipe. The Ebasco samples from this trench did not show the mercury to be present at levels quite as high as the MKE samples (a maximum value of 5.4 ug/g versus a maximum value of 25 ug/g), although in both cases the mercury concentration was above natural levels expected in these soils. There are no known documented mercury spills in this area (Ebasco, 1988c). It appears from the higher concentrations under the pipe that the arsenic and mercury originated from the sewers. The elevated levels of copper and zinc may also have originated from the chemical sewer, but because MKE did not analyze for these metals, no data are available to indicate concentration gradients.

Manhole W27

Manhole W27 is located downstream of Trench MKE 19 and received wastes from the mustard, aldrin, and dibromochloropropane production areas and a mustard

and pesticide decontamination pit. Seventeen volatile and semivolatile compounds were detected in the first three sampling intervals (6.5-7.5, 11.5-12.5, and 16.2-17.2 ft). Concentrations of note are aldrin at 100 ug/g in the 6.5 to 7.5 and 16.2 to 17.2 ft intervals (the first and third sampling intervals under the manhole) and dibromochloropropane at 200 and 400 ug/g in the 11.5 to 12.5 and 16.2 to 17.2 ft intervals, respectively. Bicycloheptadiene, an intermediate in the production of aldrin and dieldrin, was also detected in the samples from this manhole, although never above 30 ug/g. The concentrations of volatile and semivolatile organic compounds decreased at lower depths indicating that the chemical sewer may be the source of these compounds. The two deepest intervals contained only eight volatile and semivolatile target compounds ranging in concentration from 1 to 30 ug/g. Chromium, copper, lead, zinc, and mercury were present at elevated levels in the upper three samples. Only copper and zinc were above their indicator ranges in the lower two samples. Samples taken by MKE also showed elevated levels of copper, lead, and zinc in the uppermost sample.

This distribution of detectable compounds probably is due to the geology of the area. The first two samples were taken in weathered sandstone. The third sample, taken at a depth of 16.2 to 17.2 ft, was in a transition region to less fractured rock, and the following two samples came from progressively less fractured material. The decreasing amount of fractured material is less permeable than more fractured rock, causing less downward migration of chemicals from the chemical sewer.

Many nontarget halogenated and nonhalogenated hydrocarbons were tentatively identified, ranging in concentration from 30 ppm to less than 1 ppm. The concentrations and numbers of nontarget compounds detected followed the same distribution as the target compounds. Increasing depth corresponded to decreasing levels and numbers of compounds present.

Samples were collected near Manhole W27 during the Task 2 investigation of Shell spill sites (Ebasco, 1987a). Elevated levels of aldrin (1,000 and 2,000 ug/g) and dieldrin (100 and 400 ug/g) were detected in the surface

samples but not in samples taken at the 4 to 5 and 9 to 10 ft intervals. These data indicated that downward migration of target analytes from the surface had not penetrated to the depth of the sewers or below the sewers.

Trench CS02

Trench CS02 is located along the section of pipe 121 ft downstream of Manhole W27. Groundwater is high in this area, within about 2 ft of the sewer, and samples taken from the second interval beneath the pipe (11.8 to 12.8 ft) were wet. High levels of pesticides and solvents were detected in all intervals of all of the borings, whether directly under the pipe or up to 5 ft away. Most notably, aldrin was detected in all ten samples, three times at 20,000 ug/g and once at 40,000 ug/g. Dibromochloropropane was also detected at concentrations as high as 7,000 ug/g. Concentrations of chemicals did not taper off with increasing depth. The highest levels of both aldrin and dibromochloropropane were detected in Boring 7 in the saturated sample.

Numerous nontarget compounds were detected at this site. Nearly all of them were tentatively identified as either halogenated or nonhalogenated hydrocarbons. The highest concentrations were detected in Boring 7, where the maximum level was 700 ppm.

Because all of the borings in Trench CS02 contained significant amounts of target compounds, the extent of contaminant migration could not be determined from these data alone. A similar trench, SS04, was dug around the sanitary sewer about 20 ft west of Trench CS02. Results from this trench, which are included in the Sanitary Sewer - South Plants Contamination Assessment Report, showed very low levels of pesticides and metals near the pipe and nothing in saturated soils (Ebasco, 1988a). The high levels of potential contamination present in the soils under the chemical sewer, and not in soils near the sanitary sewer, indicate that the chemical sewer is the source of the potential contamination in this area.

Trench MKE 2

Trench MKE 2 is located downstream of Trench CS02, along the section of pipe

that received wastes from the white phosphorous storage and filling building and the pesticide drum filling building, in addition to those previously mentioned. Analysis of Ebasco samples showed elevated levels of pesticides, herbicides, process intermediates, and metals, with aldrin at 100 ug/g, dibromochloropropane at 32,000 ug/g, copper at 1,500 ug/g, and arsenic at 190 ug/g.

MKE data from this trench also showed high levels of these compounds, most notably aldrin at 14,000 ug/g, dibromochloropropane at 7,500 ug/g, and arsenic at 520 ug/g. These samples were analyzed for volatile organic compounds and showed the presence of solvents such as carbon tetrachloride, chlorobenzene, chloroform, methylene chloride, tetrachloroethylene, and toluene, but at concentrations that did not exceed 29 ug/g.

Nontarget compound data showed numerous halogenated and nonhalogenated hydrocarbons similar to those found in Trench CS02.

All samples collected from this trench were taken directly under the pipe or from immediately beside the pipe; none were from deeper intervals or from any distance away from the pipe. Therefore, no evidence of concentration gradients with respect to distance from the pipe could be identified. However, the types of compounds detected and the concentrations at which they were found corroborate the data from Trench CS02, which was directly upstream of this trench. It appears that the chemical sewer may be the source of these compounds.

Manhole W25

Manhole W25 is the manhole directly downstream of Trench MKE 2. Samples from directly under the channel, in the 6.9 to 7.9 ft interval of this boring, contained high levels of pesticides, including aldrin at 10,000 ug/g, dibromochloropropane at 10,000 ug/g, and isodrin at 300 ug/g. Solvents were also present, with toluene having the highest concentration at 300 ug/g. Mercury and arsenic were also present at elevated levels. Concentrations of target compounds dropped off dramatically with increasing depth, as was the

case in Manhole W27. A similar trend was not seen in Trench CS02, located between these two manholes, because of the very high water table under the trench. Sampling stopped when the water table was reached; therefore, only two intervals were sampled under Trench CS02, compared with five intervals beneath Manholes W25 and W27. A summary of groundwater depths and sewer depths is included in Table CS-SP-2. In the 16.2 to 17.2 and 21.1 to 22.1 ft intervals, copper and zinc were the only target compounds above indicator level, and both were slightly above their indicator ranges. The last interval, 26.2 to 27.2 ft, was taken in groundwater and contained 1 ug/g of chloroform as well as copper and zinc within their indicator ranges. The presence of this chloroform is due more likely to a groundwater plume than from downward migration from the chemical sewer system.

Nontarget compounds were detected in much higher concentrations in the uppermost sample than in deeper samples, as were the target compounds. Halogenated hydrocarbons were tentatively identified at concentrations ranging from 900 to 4 ppm, and a tentatively identified benzene was found at 300 ppm. The next interval contained only three tentatively identified halogenated hydrocarbons at a maximum concentration of 40 ppm, and the next three intervals did not contain any nontarget compounds of note.

Samples taken from beneath this manhole by MKE showed a similar trend. Concentrations of pesticides such as aldrin, dibromochloropropane, and isodrin were much higher in the 7.4 ft interval than in the 14.5 ft interval. Maximum values were 7,000 ug/g for aldrin, 6,000 ug/g for dibromochloropropane, and 200 ug/g for isodrin.

The contaminant concentration gradient evident beneath this manhole and the similarity of this manhole and Manhole W27 imply that the chemical sewer is the most likely source of the potential contamination.

Trenches MKE 3, MKE 4, and MKE 6

This series of trenches was dug along the portion of the chemical sewer directly downstream of Trench CS02, which collected wastes from pesticide and

Army agent manufacturing facilities, the white phosphorous and arsenic trichloride tank house, and the Army laboratory and laundry. Elevated levels of pesticides, herbicides, process intermediates, and metals were found in samples taken by Ebasco from these trenches. Most notable were aldrin at 600 ug/g and dibromochloropropane at 540 ug/g. Of the metals, copper was found at 150 ug/g, zinc at 480 ug/g, and arsenic at 740 ug/g. These trenches run past the arsenic silos, which may be the source of the arsenic.

MKE data taken from these trenches also showed high concentrations of pesticides and arsenic. Aldrin was found in three samples at 20,000 ug/g, dibromochloropropane was detected as high as 510 ug/g, and arsenic also had a maximum value of 510 ug/g. It does not appear that samples taken from directly under the pipe contain target compounds at higher concentrations than samples taken from beside the pipe.

Nontarget compound data contained numerous tentatively identified halogenated and nonhalogenated hydrocarbons similar to those found in Trench CS02.

Samples were taken only from directly under and beside the pipe in these trenches, never at deeper intervals or at any distance away from the pipe. Therefore, no obvious trends regarding contaminant migration could be identified from these data. However, the types of compounds detected and the levels at which they were found corroborate the data from Trench CS02, which was a short distance upstream of these trenches.

Trench MKE 20

Trench MKE 20 is located one manhole upstream of Trench CS01, and both are along a branch of the sewer that joins the main line at Manhole W22. Ebasco collected three samples from directly under the pipe, and analysis showed elevated levels of aldrin, dieldrin, dibromochloropropane, copper, lead, zinc, and mercury. The nontarget analysis tentatively identified two chlorinated hydrocarbons in the samples containing aldrin and dieldrin.

Analysis of MKE data showed concentrations of methylene chloride ranging from 2.3 to 2.9 ug/g, which again may be due to laboratory background. The only other target compound above its indicator level was mercury at 1.5 ug/g, found in the sample from directly under the pipe.

Considering the limited amount of data available, it is possible that the target compounds detected in this trench originated from the chemical sewer.

Trench CS01

Trench CS01 is located along a section of the chemical sewer line that collected wastes from pesticide and Army agent manufacturing facilities and from the Army laboratory and laundry. Semivolatile and volatile organic compounds, ICP metals, arsenic, and mercury were noted in borings from this trench.

Concentrations of the organic compounds and metals decrease with distance from the pipe both horizontally and vertically, with organic compounds absent entirely in the lower three sampling intervals. Aldrin, dieldrin, tetrachloroethylene, and methylene chloride were found in samples taken from directly below the pipe. Boring 8, 1 ft away from the pipe, contained only tetrachloroethylene in the 8 to 9 ft interval; Boring 9, 5 ft away from the pipe, did not contain any volatile or semivolatile target compounds. Metals, most notably zinc and arsenic, were also present at elevated levels near the pipe. Samples taken by MKE from directly under the pipe showed elevated levels of mercury and zinc. Boring 9 contained no arsenic and only slightly elevated levels of zinc and copper. This boring penetrated claystone, so higher levels of zinc and copper are to be expected based on the natural levels found in these materials at RMA.

In addition, a composite grab sample was collected of yellow material that was found on several joints along the exposed pipe. This sample contained elevated levels of dieldrin, chromium, zinc, arsenic, and mercury. The yellow color may have been due to the presence of chromate ions, a chromium species characterized by a bright yellow color.

Nontarget compounds tentatively identified at this location were primarily halogenated hydrocarbons ranging in concentration from 20 to 0.4 ppm, except in the grab sample where the concentration rose to 40 to 20 ppm. Other tentatively identified compounds included unidentified phthalates and organophosphorus substances. Again, the concentrations of compounds detected decreased with distance from the pipe.

The observed concentration gradients around the pipe suggest that the target and nontarget compounds originated from the chemical sewer.

Manhole W21

Manhole W21 is the second manhole downstream of Trench CS01 and MKE Trenches 2, 3, and 4. Volatile and semivolatile organic compounds are prevalent down to and including the 17.0 to 18.0 ft interval, 10 ft below the pipe and 10 ft above the water table. Some concentrations of note were dibromochloropropane at 800 ug/g and arsenic at 300 ug/g in the 8.0 to 9.0 ft interval, arsenic at 430 ug/g in the 10.5 ft interval (MKE sample) and aldrin at 100 ug/g in the 17.0 to 18.0 ft interval. No compounds exceeded 100 ug/g in the 12.0 to 13.0 ft interval. In general, concentrations of compounds detected in the 22.0 to 23.0 and 27.0 to 28.0 ft intervals are considerably lower than those found at shallower depths.

This distribution of contaminants probably is due to the geology of the area. Weathered claystone overlies less permeable siltstone. The transition between these two units occurs approximately at the 17.0 to 18.0 ft interval where there appears to be a buildup of some, but not all, of the target compounds. These include carbon tetrachloride, tetrachloroethylene, bicycloheptadiene, chlorobenzene, aldrin, isodrin, parathion, and supona. Chemicals released from the chemical sewer have migrated downward through the weathered claystone but have been slowed by the siltstone.

The sample taken from the 27.0 to 28.0 ft interval was wet, and therefore was in contact with groundwater. This sample contained aldrin at 10 ug/g and some solvents ranging in concentration from 0.5 to 7 ug/g. These compounds were

not found in the 22.0 to 23.0 ft interval, except chloroform, and are probably due to groundwater plumes rather than downward migration from the sewer.

The tentative identification of nontarget compounds showed the presence of several halogenated and nonhalogenated hydrocarbons as well as a small amount of an organophosphorus compound. In general, these followed the same distribution as the target compounds. Most of the compounds appeared in the first three intervals, with the exception of an isomer of aldrin. This isomer was found in the 27.0 to 28.0 ft interval at a concentration of 100 ppm.

It appears that target and nontarget compounds detected in this boring, except for the solvents found beneath the water table originated from the chemical sewer.

Trench MKE 21

Trench MKE 21 is located along a section of the chemical sewer upstream of Manhole 6-1, which collected wastewater from the Army laboratory and laundry. This section was part of the nontoxic sewer servicing the chlorine plant just west of "D" Street and was connected to the chemical sewer in 1956. No semivolatile compounds were found in either of the two samples taken from beneath the pipe. Lead and zinc were both present within their indicator ranges. No nontarget compounds of note were detected.

Samples collected from this trench by MKE showed no evidence of semivolatile organic compounds, arsenic, or mercury. Methylene chloride was detected in three of the samples at concentrations consistent with those found in other samples. This consistency and prevalence may be taken as an indication of laboratory background contamination.

Manhole 6-1

Manhole 6-1 is also located in the chlorine plant area along a part of the chemical sewer line that is downstream of Trench MKE 21. The upper sample from this manhole did not contain any volatile or semivolatile target compounds. The second sampling interval contained only 1,1,2-trichloroethane

at 0.8 ug/g. The solvents 1,1,1-trichloroethane, carbon tetrachloride, and tetrachloroethylene were detected at 1 ug/g or less in the 23.5 to 24.5 ft interval, slightly above the water table (26 ft). The presence of these compounds is probably related to groundwater plumes. Copper and zinc were also slightly above their indicator ranges in several of the samples. Soils from these samples had a clay component, so the slightly elevated levels of metals can be expected.

Trench CS03

Trench CS03 is located in the chlorine plant area. The most notable target analyte found at this site was hexachlorocyclopentadiene, an intermediate in the production of aldrin and dieldrin. This compound was found in borings from directly under the pipe at levels of 300 ug/g, 2,000 ug/g, 3,000 ug/g, and 4,000 ug/g. Some solvents were also present, but not at concentrations above 40 ug/g. Lead was found at levels of 640 and 150 ug/g in two of the borings. The highest levels of target analytes were detected in unconsolidated material found directly under the pipe. The concentrations of chemicals decrease with depth and distance from the pipe. Samples taken 1 and 5 ft away from the pipe and at depths below the pipe contain only copper and zinc within or slightly above their indicator ranges, with occasional occurrences of arsenic and mercury within or above their indicator ranges. Soils under this trench have a clay component and therefore the slightly elevated levels of copper and zinc can be expected.

Numerous halogenated hydrocarbons were tentatively identified in the nontarget GC/MS analysis. All were present in samples taken from directly under the pipe. No compounds of note were found in samples taken away from the pipe or farther below the pipe.

In addition, one sample was taken from along the top of the pipe where a crack had leaked dye during the field work. The only target compound found in this sample was arsenic, which was within its indicator range. A tentatively identified compound containing 3 chlorines was detected in this sample at 2 ppm in the GC/MS analysis.

The concentration gradients of target and nontarget analytes around the pipe implies that these compounds originated from the chemical sewer.

Manhole 4-3

This manhole is located along the western edge of the chlorine plant area and, like Manhole 6-1 and the sewer in Trenches CS03 and MKE 21, it was originally part of the nontoxic contaminated waste line. Samples from this manhole contained methylene chloride at 1 ug/g in the first three intervals, trichloroethylene at 0.6 ug/g in the second interval, and aldrin at 2 ug/g in the first interval. Samples taken by MKE also showed aldrin in the first sampling interval at a concentration of 1.0 ug/g. Zinc was found at 82 ug/g, slightly above its indicator range, in soil having a clay component, where an elevated concentration may be expected. Two nontarget compounds of note were tentatively identified as bromodichloromethane, found at 9 ppm, and an alkylated phenol, found at 0.4 ppm, both in the fourth sampling interval (17.2 to 18.2 ft).

The compounds detected in samples from this manhole do not exhibit obvious trends of decreasing concentration with distance from the pipe, with the possible exception of aldrin. Although compounds of this sort were not anticipated in this area, and unless other data become available, it will be assumed that these compounds originated from the chemical sewer.

Trench MKE 7

Trench MKE 7 was dug along an abandoned portion of the chemical sewer in Section 35. This line was originally intended to carry caustic waste from the chlorine plant area to an impermeable basin, but it was never used for that purpose (CWS, 1945a; CWS, 1945b; Donnelly, undated). No target analytes were detected within or above their indicator levels in the Ebasco samples from this trench. One nontarget compound was detected at a low concentration (0.5 ppm) and was tentatively identified as a phthalate, a plasticizer ubiquitous in the environment at RMA.

Results of the MKE sampling program showed methylene chloride in four of the eight samples at concentrations ranging from 2.4 to 12 ug/g. Methylene chloride is a common laboratory solvent and its presence here may be an indication of laboratory contamination. Arsenic was the only other target analyte detected, and was found in the three uppermost samples at concentrations of 18, 18, and 21 ug/g. These samples were all taken from soils with a clay component, which may account for the elevated levels of arsenic.

Nontarget compounds detected in the MKE samples included those tentatively identified as phthalates, alcohols, acids, esters, and three instances of a substituted alkene. The phthalates are plasticizers, which are prevalent in the environment at RMA and which were present in low concentrations, the maximum being 8.9 ug/g. Alcohols, esters, and hexadecanoic acid are often associated with naturally occurring compounds and were present in concentrations of up to 36 ug/g. The three substituted alkenes were present at concentrations of 9.8, 0.5, and 5.1 ug/g. Compounds of this nature were not anticipated in this area.

Data from the Ebasco sampling program showed no target compounds or nontarget compounds of note, while the MKE sampling program tentatively identified some hydrocarbons in the nontarget analysis. All available documentation regarding this part of the sewer line states that it was never used. It is therefore unlikely that any potential contamination detected in the trench originated from the sewer line.

3.3 FOLLOW-ON SURVEY

The nature and extent of potential contamination associated with the South Plants chemical sewer has been defined so that a worst-case estimate can be made of the quantity of potentially contaminated soil. Therefore, no follow-on investigations are recommended for the chemical sewer system in the South Plants area.

3.4 QUANTITY OF POTENTIALLY CONTAMINATED SOIL

Based on the results of the field program, the estimated volume of potentially contaminated soil, rounded to two significant figures, is 120,000 cubic yards (yd^3) with an estimated overburden of 120,000 yd^3 .

The South Plants chemical sewer system will be divided into two parts: the portion in Section 2 that was originally the nontoxic waste system and the portion in Section 1 that serviced the main manufacturing area.

In Section 2, samples from Trench CS03 contained potential contamination directly below the pipe and up to 1 ft away from the pipe. Samples 5 ft away from the pipe and 5 ft below the pipe did not contain compounds at levels considered to be potentially contaminated. Trench MKE 21 did not contain any analytes above their indicator levels. Manhole 4-3 showed elevated levels of target analytes in the first three sampling intervals but not in the fourth, 15 ft below the manhole. Manhole 6-1 contained elevated levels of solvents in the 23.5 to 24.5 ft interval, which have been attributed to groundwater plumes. Shallower samples did not contain target analytes at levels considered to be potentially contaminated.

The depth of potential contamination will be assumed to extend 15 ft below the pipe (based on Manhole 4-3) and 5 ft on either side of the pipe (based on Trench CS03). The volume of potentially contaminated soil will be estimated by assuming a width of 11.5 ft, which includes 5 ft on each side of the pipe and the maximum pipe diameter of 18 in, and by assuming a depth of 16.5 ft, which includes the maximum pipe diameter and 15 ft beneath the pipe. The pipe length includes all pipe west of Manhole 6-4.

Estimated Volume of Potentially Contaminated Soil:

Length	=	5,300 ft
Depth	=	16.5 ft
Width	=	11.5 ft
Volume	=	37,000 yd^3

Estimated Volume of Overburden:

Length	=	5,300 ft
Average depth to pipe	=	10 ft
Width	=	11.5 ft
Volume	=	23,000 yd ³

Samples collected in Section 1 showed potential contamination along the chemical sewer pipe and at depth beneath the pipe. Therefore, the entire chemical sewer line in Section 1 is assumed to be potentially contaminated, with the exception of the overhead line originating in the hydrazine facility and the line connecting Manholes A, B, and C from Building 732, which was never used.

The approximate length of this portion of the sewer line is 18,000 ft. The soil is assumed to be potentially contaminated from the top of the pipe to the water table. The maximum pipe diameter is 12 in, and the average distance from the pipe to the water table is 5 ft; therefore, the depth used for the calculation is 6 ft. Samples collected 5 ft away from the pipe contained detectable analytes at concentrations that decreased with distance away from the pipe. Therefore, the width of potentially contaminated soil is assumed to extend 10 ft on each side of the pipe, giving a total width including the pipe diameter of 21 ft.

Estimated Volume of Potentially Contaminated Soil:

Length	=	18,000 ft
Depth	=	6 ft
Width	=	21 ft
Volume	=	84,000 yd ³

Estimated Volume of Overburden:

Length = 18,000 ft
Average depth
to pipe = 7 ft
Width = 21 ft
Volume = 98,000 yd³

Results from the field survey were used to generate a most conservative (worst-case) estimate of the volume of potentially contaminated soil along the chemical sewer in South Plants. This delineation of the boundaries of potential contamination should not be construed to indicate the actual presence of contamination within the volumes outlined. In addition, this approach is not intended to imply that any or all of the soil within the potentially contaminated volume must be remediated, nor does it make any assumption about the type of remediation that may be required. Rather, this approach is intended to provide preliminary estimates of the maximum possible volume of contaminated materials for planning purposes only.

4.0 REFERENCES CITED

- ASTM (American Society for Testing Materials). 1986. Practice for installing vitrified clay pipelines. Designation C12-82.
- Black and Veatch. 1981, August. Liquid waste disposal facility, Basin "F" area plan and profiles. Drawing No. 71-07-15.
- CWS (Chemical Warfare Service). 1945a, April 15. History of Rocky Mountain Arsenal Part I, Arsenal layout, physical facilities and construction, section 1D: Industrial waste and sanitary sewage disposal systems. Microfilm RSA008, Frames 0597-0613.
- CWS. 1945b, April 15. History of Rocky Mountain Arsenal- 1945 part VI, service functions, section 1D: Industrial waste and sanitary sewage disposal systems. Microfilm RSA010, Frames 2054-2065.
- CWS. 1952. History of RMA 1 April, 1952 through 30 June. Microfilm RMA192, Frames 1646-1647.
- COE (U.S. Army Corps of Engineers). 1984, June 1. Master plan of the Rocky Mountain Arsenal, Colorado. Basic information maps. Omaha District COE. Drawing No. 18-02-01.
- Craft, H.D. 1982, April 8. Memorandum, survey of post work on contaminated sewers. Microfilm RSH911, Frames 1902-1927.
- DOA (Department of the Army). 1957, January, 19. Contaminated waste line addition, plans, sections, and details, East Plants area, RMA.
- Donnelly, G.F. 1951, September 26. Installation of HD filling line. Microfilm RMA005, Frames 2043-2046.
- Donnelly, G.F. 1960. Memo to Commanding General, U.S. Army Chemical Center and Chemical Corps. Subject: water contamination, RMA. Microfilm RMA060, Frame 1932.
- The Earth Technology Corporation. 1987a, June 10. Letter to Dale Gabel: Draft report, laboratory geotechnical testing of contaminated material. Contract No. EN 77059. ETC Proposal No. 87-215-35.
- The Earth Technology Corporation. 1987b, July 7. Letter to Dale Gabel: Draft report, laboratory geotechnical testing of contaminated material. Contract No. EN 77059/RMA TETC No. 87-215-35.
- Ebasco Services Incorporated. 1987a, January. Draft phase I contamination assessment report, Site 1-13 and 2-18. South plants manufacturing complex Shell Chemical Company spill sites. Task No. 2. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

RIC 87336R30

Ebasco. 1987b, November. Final technical plan, task no. 10, sewers and process water system investigations. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Ebasco. 1988a, June. Final contamination assessment report sanitary sewer - South Plants. Version 3.2. Task no. 10. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Ebasco. 1988b, June. Draft final summary of results-structures survey, volume II. Version 2.2. Task no. 24. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Ebasco. 1988c, May. Rocky Mountain Arsenal chemical index. Prepared for Program Manager's Office for Rocky Mountain Arsenal Cleanup.

Ebasco. 1988d, April. Draft final, phase I data presentation report. Army spill sites, south plants manufacturing complex. Version 2.1. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Ebasco. 1988e, April. Draft final, phase I data presentation report. South plants regional study, south plants manufacturing complex. Version 2.1. Contract No. DAAK11-84-D-0017. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

ESE (Environmental Science and Engineering, Inc.). 1987a, April. Final phase I contamination assessment report: site 36-20, chemical sewer, Task 1 (section 36).

ESE. 1987b, May. Draft phase I contamination assessment report: Site 35-2/26-9, chemical sewer.

RIC 86317R01

ESE. 1986a. Water quantity/quality survey. Task 4 Draft final screening program report, v. I, II, III. Prepared for Program Managers Office for Rocky Mountain Arsenal Contamination Cleanup.

RIC 87012R65

ESE. 1986b. Introduction to the contamination assessment reports. RMA. Prepared for Program Manager's Office for Rocky Mountain Arsenal Contamination Cleanup.

Gabel, D. 1987, April 9. Letter to Kevin Blose. Subject: Manholes to the southwest of the lime settling basins in Section 36. RMA10-EDEN-USA-T-015.

Green, James. 1987, December 1. Personal communication with Carolyn Crosson, Ebasco Services, Inc. Subject: welded cast iron joints.

HRO (Holme, Roberts & Owen). 1988, February 17. Letter to Don Campbell: United States vs. Shell Oil. Transmittal of MKE sewers investigation data.

HRO. 1987, December 2. Letter to Don Campbell: United States vs. Shell Oil. Transmittal of MKE sewers investigation data.

JHC (Julius Hyman & Company). 1949. December. Supplemental assessment #5 to lease. W-25-075-ENG-7886. Microfilm RSH 915, Frames 841-850.

JHC. 1953. No title. Drawing No. C-2436.

RIC 81295R07

Kolmer, J.R. and G.A. Anderson. 1977. Installation of RMA, part I - pilot containment operations final environmental impact statement. Microfilm RMA065, Frames 0484-0485.

RIC 82295R01

May, J.H. 1982. Regional groundwater study of Rocky Mountain Arsenal, Colorado: Report #1 hydrogeological definition. U.S. Army Engineers Waterways Experiment Station (USAEWES). Microfilm RMA040, Frames 1851-1931.

Meetze, A.W. 1953, August 21. Summary of meeting to discuss chemical sewer, cause of trouble and how to overcome difficulty and restore service. Microfilm RLA002, Frames 0490-0491.

Mitchell, K.D. 1986, March 18. Juris deposition, v. 4. Juris Computer Database.

MKE (Morrison-Knudsen Engineers, Inc.). 1986, April. Interim report: phase I of Rocky Mountain Arsenal sewer investigations.

Parsons, Ralph M. & Company. 1955, September 29. Final report, disposal of chemical wastes, Rocky Mountain Arsenal. Contract No. DA-25-066-eng-3452. Prepared for Department of the Army.

RMA. Undated. Description of utilities, Rocky Mountain Arsenal, Denver, Colorado. Revised June, 1954. Microfilm RMA 073, Frame 0432.

RIC 84034R01

RMACCPMT. 1984, January. Decontamination assessment of land and facilities at RMA. Draft final report and executive summary, Appendix C.

SCC (Shell Chemical Company) 1970a, May 26. Request for expenditure and routing sheet no. 72-66, "534B north sewer replacement," with attached estimated cost summary.

SCC. 1970b, July 16. Request for expenditure and routing sheet no. 70-54, "sump removal east of Bldg. 514," with attached estimated cost summary.

- SCC. 1972a, May 26. Request for expenditure and routing sheet no. 72-66. "534B north sewer replacement," with attached estimated cost summary. Microfilm RSH911, Frames 1934-1936.
- SCC. 1972b, October 24. Request for expenditure and routing sheet no. 72-118, dated October 24, 1972, "Bldg 516 sump replacement," with attached estimated cost summary.
- SCC. 1974a, January Request for expenditure and routing sheet no. 74-146, "extension of contaminated sewer to flare tower," with attached estimated cost summary. Microfilm RSH911, Frames 1938-1940.
- SCC. 1974b, June 8. Request for expenditure and routing sheet no. 74-66, "contaminated sewer line/BCH," with attached estimated cost summary. Microfilm RSH911, Frames 1936-1937.
- SCC. 1975a, June 27. Request for expenditure and routing sheet no. 75-61, "514 sewer replacement" with attached estimated cost summary.
- SCC. 1975b, February, 26. Request for expenditure and routing sheet no. 75-26. "replacement of Manhole #18 and #19 at Bldg. 471" with attached estimated cost summary.
- SCC. 1975c, May 12. Work order, "F" Basin pipeline replacement. Microfilm RSH933, Frame 1449.
- SCC. 1976a, January 7. Request for expenditure and routing sheet no. 76-4, "diversion of surface drainage to the contaminated sewers" with attached estimated cost summary. Microfilm RSH911, Frames 1944-1947.
- SCC. 1976b, March 1. Request for expenditure and routing sheet no. 76-29, "Installation of a new contaminated effluent sump east of building 514A," with attached estimated cost summary. Microfilm RSH911. Frames 1949-1950.
- SCC. 1978a, February 10. Request for expenditure and routing sheet no. 78-17, "building 514 west contaminated water sump," with attached estimated cost summary. Microfilm RSH911, Frames 1954-1955.
- SCC. 1979a, January 12. Request for expenditure and routing sheet no. 79-1, "Ventilation on the contaminated sewer at building 471, "with attached estimated cost summary. Microfilm RSH963 1856-1958.
- SCC. 1979b, September 7. Memorandum of Discussion: leasehold groundwater problem. Microfilm RSH817, Frames 0443-0448.
- SCC. 1979c, December 19. Request for expenditure and routing sheet no. 79-109, "building 471 contaminated sewer reroute," with attached estimated cost summary. Microfilm RSH911 1975-1977.

SCC. 1980, April 10. Request for expenditure and routing sheet no. 80-20, "chemical sewer replacement," with attached estimated cost summary. Microfilm, RSH911 1978-1981.

RIC 83228R01

Spaine, P.W., and R. Gregg. 1983, July. Surface water quality study of the South Plants area.

RIC 81293R05

Stollar, R.L., and F. Van der Leeden. 1981, January. Evaluation of the hydrogeologic system and contamination migration patterns, Rocky Mountain Arsenal, final report. Geraghty & Miller, Inc.

USAEHA (U.S. Army Environmental Hygiene Agency). 1965, February. Report of industrial waste survey project no. 3471E19-59/66. Rocky Mountain Arsenal Denver, Colorado. 9-21 February 1965. Microfilm RAA016, Frames 1870-1919.

RIC 86213R02

USAEHA. 1984, April 26. Wastewater engineering study No. 32-66-0108-84, Rocky Mountain Arsenal 15-29 February 1984.

USAEHL (U. S. Army Environmental Health Laboratory). 1960, June.

Preliminary report: Industrial waste study, Rocky Mountain Arsenal. Microfilm RNA006, Frames 0345-0387.

Vess, J.H. 1953, August 21. Repair of chemical sewer line at RMA, damaged portion of sewer line destroyed by high acid content from Building 412 is a reimbursable cost. Microfilm RLA002, Frames 0488-0489.

WR&SK (Whitman, Requardt & Smith--H.A. Kuljian & Co.), Engineers. 1943, January 8. Rocky Mountain Arsenal process waste disposal, plants area, general plan. Drawing No. 7164-2030. As-built data added 2/2/54.

Appendix CS-A

Chemical Names and Abbreviations

APPENDIX CS-A
Chemical Names and Abbreviations

Analytic Methods

Abbreviations

Atomic Absorption Spectroscopy
Gas Chromatography/Conductivity Detector
Gas Chromatography/Electron Capture Detector
Gas Chromatography/Flame Ionization Detector
Gas Chromatography/Flame Photometric Detector
Gas Chromatography/Mass Spectrometry
Gas Chromatography/Nitrogen Phosphorous Detector
Gas Chromatography/Photoionization Detector
High Performance Liquid Chromatography
Inductive Coupled Argon Plasma Screen
Ion Chromatography
Spectrophotometry

AA
GCCON
GCECD
GCFID
GCFPD
CCMS
GCNPD
GCPID
HPLC
ICP
IONCHROM
SPECT

PHASE I ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u>		<u>TDG</u>
Chloroacetic acid	Chloroacetic acid	CLC2A
Thiodiglycol	Thiodiglycol (TDG)	TDGCL
<u>AGENT PRODUCTS/IONCHROM</u>		<u>GBDP</u>
Isopropylmethylphosphonic acid	Isopropylmethylphosphonate	IMPA
<u>ANIONS/IONCHROM</u>		<u>ANIONS</u>
Chloride	Chloride	CL
Fluoride	Fluoride	FL
Sulfate	Sulfate	SO4
<u>ARSENIC/AA</u>	Arsenic	AS
<u>DIBROMOCHLOROPROPANE/GCECD</u>	Dibromochloropropane	<u>DBCP</u>
<u>HYDRAZINES/SPECT</u>		<u>HYD</u>
Hydrazine	Hydrazine	HYDRZ
Methylhydrazine	Methylhydrazine	MHYDRZ
Unsymmetrical dimethyl hydrazine	Unsymmetrical dimethyl hydrazine	UDMH
<u>MERCURY/AA</u>	Mercury	HG

APPENDIX CS-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>METALS/ICP</u>		
Cadmium	Cadmium	ICP
Chromium	Chromium	CD
Copper	Copper	CR
Lead	Lead	CU
Zinc	Zinc	PB
		ZN
<u>ORGANONITROGEN COMPOUNDS/GCNPB</u>		
n-Nitrosodimethylamine	n-Nitrosodimethylamine	ONC
n-Nitrosodi-n-propylamine	n-Nitrosodi-n-propylamine	NNDMEA
		NNDNPA
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u>		
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	OPC
Dimethylmethyl phosphonate	Dimethylmethyl phosphate	DIMP
		DMMP
<u>SEMIVOLATILE ORGANIC COMPOUNDS/ GCMS</u>		
1,4-Oxathiane	1,4-Oxathiane	SVO
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	OXAT
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	PPDDE
Aldrin	Aldrin	PPDDT
Atrazine	Atrazine	ALDRN
Chlordane	Chlordane	ATZ
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	CLDAN
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO2
Dibromochloropropane	Dibromochloropropane	CPMSO
Dicyclopentadiene	Dicyclopentadiene	DBCP
Dieldrin	Dieldrin	DCPD
Diisopropylmethyl phosphonate	Diisopropylmethyl phosphonate	DLDRN
Dimethylmethyl phosphonate	Dimethylmethyl phosphonate	DIMP
Dithiane	Dithiane	DMMP*
Endrin	Endrin	DITH
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	ENDRN
Isodrin	Isodrin	CL6CP
Malathion	Malathion	ISODR
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl-diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
		DDVP

* DMMP is certified as part of the semivolatile organic compound method only for Hittman-Ebasco Laboratory.

APPENDIX CS-A (Continued)
Phase I

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
VOLATILE ORGANIC COMPOUNDS/ GCMS		VO
1,1-Dichloroethane	1,1-Dichloroethane	11DCLE
1,2-Dichloroethane	1,2-Dichloroethane	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	111TCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	112TCE
Benzene	Benzene	C6H6
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Carbon tetrachloride	Carbon tetrachloride	CCL4
Chlorobenzene	Chlorobenzene	CLC6H5
Chloroform	Chloroform	CHCL3
Dibromochloropropane	Dibromochloropropane	DBCP
Dicyclopentadiene	Dicyclopentadiene	DCPD
Dimethyldisulfide	Dimethyldisulfide	DMDS
Ethylbenzene	Ethylbenzene	ETC6H5
m-Xylene	m-Xylene	13DMB
Methylene chloride	Methylene chloride	CH2CL2
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
o- and p-Xylene	Ortho- & Para-xylene	XYLEN
Tetrachloroethylene	Tetrachloroethene	TCLEE
Toluene	Toluene	MEC6H5
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	12DCE
Trichloroethylene	Trichloroethene	TRCLE

**APPENDIX CS-A
Phase II**

**PHASE II ANALYTES AND CERTIFIED METHODS
SOIL SAMPLES**

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>AGENT PRODUCTS/HPLC</u> (Same as Phase I)		<u>TDG</u>
<u>AGENT PRODUCTS/IONCHROM</u> (Same as Phase I)		<u>GBDP</u>
<u>ANIONS/IONCHROM</u> (Same as Phase I)		<u>ANIONS</u>
<u>ARSENIC/AA</u>	Arsenic	<u>AS</u>
<u>DIBROMOCHLOROPROPANE/GC</u>	Dibromochloropropane	<u>DBCP</u>
<u>HYDRAZINES/SPECT</u> (Same as Phase I)		<u>HYD</u>
<u>MERCURY/AA</u>	Mercury	<u>HG</u>
<u>METALS/ICP</u> (Same as Phase I)		<u>ICP</u>
<u>ORGANOCHLORINE PESTICIDES/GCECD</u>		<u>OCP</u>
2,2-bis(Para-chlorophenyl)- 1,1-dichloroethane	Dichlorodiphenylethane	<u>PPDDE</u>
2,2-bis(Para-chlorophenyl)- 1,1,1-trichloroethane	Dichlorodiphenyltrichloro- ethane	<u>PPDDT</u>
Aldrin	Aldrin	<u>ALDRN</u>
Chlordane	Chlordane	<u>CLDAN</u>
Dieldrin	Dieldrin	<u>DLDRN</u>
Endrin	Endrin	<u>ENDRN</u>
Hexachlorocyclopentadiene	Hexachlorocyclopentadiene	<u>CL6CP</u>
Isodrin	Isodrin	<u>ISODR</u>
<u>ORGANONITROGEN COMPOUNDS/GCNP</u> (Same as Phase I)		<u>ONC</u>
<u>ORGANOPHOSPHOROUS COMPOUNDS/GCFPD</u> (Same as Phase I)		<u>OPC</u>

APPENDIX CS-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
ORGANOPHOSPHORUS PESTICIDES/ GCNPD		
Atrazine	Atrazine	OPP
Malathion	Malathion	ATZ
Parathion	Parathion	MLTHN
Supona	2-Chloro-1 (2,4-dichlorophenyl) vinyl diethyl phosphates	PRTHN
Vapona	Vapona	SUPONA
		DDVP
ORGANOSULPHUR COMPOUNDS/GCCPD		
1,4-Oxathiane	1,4-Oxathiane	OSC
Chlorophenylmethyl sulfide	p-Chlorophenylmethyl sulfide	OXAT
Chlorophenylmethyl sulfone	p-Chlorophenylmethyl sulfone	CPMS
Chlorophenylmethyl sulfoxide	p-Chlorophenylmethyl sulfoxide	CPMSO2
Dimethyldisulfide	Dimethyldisulfide	CPMSO
Dithiane	Dithiane	DMDS
		DITH
SEMIVOLATILE ORGANIC COMPOUNDS/ GCMS		
(Same as Phase I)		SVQ
VOLATILE AROMATIC ORGANIC COMPOUNDS/GCPID		
Benzene	Benzene	VAQ
Ethylbenzene	Ethylbenzene	C6H6
m-Xylene	m-Xylene	ETC6H5
o- and p-Xylene	Ortho- & Para-xylene	13DMB
Toluene	Toluene	XYLEN
		MEC6H5
VOLATILE HALOGENATED ORGANIC COMPOUNDS/GCCON		
1,1-Dichloroethane	1,1-Dichloroethane	VHQ
1,2-Dichloroethane	1,2-Dichloroethane	11DCLE
1,1-Dichloroethene	1,1-Dichloroethene	12DCLE
1,1,1-Trichloroethane	1,1,1-Trichloroethane	11DCE
1,1,2-Trichloroethane	1,1,2-Trichloroethane	111TCE
Carbon tetrachloride	Carbon tetrachloride	112TCE
Chlorobenzene	Chlorobenzene	CCL4
Chloroform	Chloroform	CLC6H5
Methylene chloride	Methylene chloride	CHCL3
Tetrachloroethylene	Tetrachloroethene	CH2CL2
Trans-1,2-dichloroethylene	Trans-1,2-dichloroethene	TCLEE
Trichloroethylene	Trichloroethene	T12DCE
		TRCLE

APPENDIX CS-A (Continued)
Phase II

<u>Analysis/Methods/Analytes</u>	<u>Synonymous Names Used in Appendix B</u>	<u>Abbreviations</u>
<u>VOLATILE HYDROCARBON COMPOUNDS/ GC/FID</u>		<u>HYDCBN</u>
Bicycloheptadiene	Bicycloheptadiene	BCHPD
Dicyclopentadiene	Dicyclopentadiene	DCPD
Methylisobutyl ketone	Methylisobutyl ketone	MIBK
<u>VOLATILE ORGANIC COMPOUNDS/GCMS</u> (Same as Phase I)		VO

Appendix CS-B

Chemical Data

APPENDIX CS-B
Chemical Data

The analytical results of the laboratory analysis of soil samples collected as part of the program comprise the first part of Appendix CS-B. Data are listed sequentially by boring number and successive depths below the surface. Within each depth, all analytes for which the samples were tested are listed alphabetically. Results are given as less than (LT) the detection limit for the test laboratory, or as detected concentrations above this limit. Based on the accuracy of laboratory test methods, values for volatile and semivolatile compounds are considered accurate to one significant figure, values for dibromochloropropane when tested separately and for metals are considered accurate to two significant figures.

The second part of Appendix CS-B contains data from the blanks associated with the analytical work. Blanks for the soil samples were based on a homogenized subsample of composited samples from a known uncontaminated soil that is stratigraphically similar to the RMA soils. Blanks for the water samples were based on distilled water. Control samples, or blanks, are introduced into the train of environmental samples to function as monitors on the performance of the analytical method. These samples function as quality control (QC) samples, and are an integral part of the quality assurance (QA) program for the project. The method blanks listed in this Appendix were utilized to verify that the laboratory was not a source of sample contamination. If contamination were detected in a method blank, corrective actions were taken to assure that reported concentrations of target analytes reflected sample analytes, and not analytes introduced by the laboratory process.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000421	8-9	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BV0002
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV0002
			1,1-Dichloroethane	LT 2. +00	ug/g	BV0002
			1,2-Dichloroethane	LT 2. +00	ug/g	BV0002
			1,2-Dichloroethane	LT 6. -01	ug/g	BV0002
			m-Xylene	2.2 +01	ug/g	BV0002
			Aldrin	5. -01	ug/g	BV0004
			Arsenic	3.02+02	ug/g	BV0005
			Atrazine	LT 3. -01	ug/g	BV0004
			Bicycloheptadiene	2.1 +00	ug/g	BV0002
			Benzene	LT 3. -01	ug/g	BV0002
			Carbon Tetrachloride	5.1 +00	ug/g	BV0002
			Cadmium	1.02+01	ug/g	BV0005
			Methylene Chloride	LT 2. +00	ug/g	BV0002
			Chloroform	1.9 +01	ug/g	BV0002
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BV0004
			Chlorobenzene	5.3 +00	ug/g	BV0002
			Chlordane	LT 2. +00	ug/g	BV0004
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BV0004
			p-Chlorophenylmethyl Sulfide	LT 3. -01	ug/g	BV0004
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BV0004
			Chromium	4.54+01	ug/g	BV0005
			Copper	3.58+01	ug/g	BV0005
			Dibromochloropropane	LT 3. -01	ug/g	BV0004
			Dibromochloropropane	8.2 +02	ug/g	BV0002
			Dicyclopentadiene	LT 1. +00	ug/g	BV0004
			Dicyclopentadiene	LT 7. -01	ug/g	BV0002
			Vapona	LT 3. +00	ug/g	BV0004
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BV0004
			Dithiane	LT 4. -01	ug/g	BV0004
			Dieldrin	LT 3. -01	ug/g	BV0004
			Dimethyldisulfide	LT 2. +01	ug/g	BV0002
			Endrin	LT 5. -01	ug/g	BV0004
			Ethylbenzene	LT 4. -01	ug/g	BV0002

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000421	8-9	Soil	Mercury	LT 5.05-01	ug/g	BVD015
			Isodrin	1. +00	ug/g	BVM004
			Toluene	2.3 +01	ug/g	BV0002
			Methylisobutyl Ketone	LT 7. -01	ug/g	BV0002
			Malathion	LT 7. -01	ug/g	BVM004
			1,4-Oxathiane	LT 3. -01	ug/g	BVM004
			Lead	2.53+01	ug/g	BVJ005
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVM004
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVM004
			Parathion	LT 9. -01	ug/g	BVM004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVM004
			Tetrachloroethene	9.1 +00	ug/g	BV0002
			Thiodiglycol	LT 2.55+00	ug/g	BS1001
			Trichloroethene	LT 5. -01	ug/g	BV0002
			Ortho- & Para-Xylene	2.2 +01	ug/g	BV0002
			Zinc	9.77+01	ug/g	BVJ005
1001000421	12-13	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BV0003
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV0003
			1,1-Dichloroethane	LT 2. +00	ug/g	BV0003
			1,2-Dichloroethane	LT 2. +00	ug/g	BV0003
			m-Xylene	LT 6. -01	ug/g	BV0003
			Aldrin	1.3 +00	ug/g	BV0003
			Arsenic	LT 3. -01	ug/g	BVM005
			Atrazine	4.55+01	ug/g	BVK006
			Bicycloheptadiene	LT 3. -01	ug/g	BVM005
			Benzene	7.1 -01	ug/g	BV0003
			Carbon Tetrachloride	LT 3. -01	ug/g	BV0003
			Cadmium	3.6 -01	ug/g	BV0003
			Methylene Chloride	LT 7.36-01	ug/g	BVJ006
			Chloroform	2.9 +00	ug/g	BV0003
				4.6 +00	ug/g	BV0003

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated Rocky Mountain Arsenal Program 01/27/88
 Summary of Analytical Results Task 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
10011000421	12-13	Soil	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVM005
			Chlorobenzene	LT 1. +00	ug/g	BV0003
			Chlordane	LT 2. +00	ug/g	BVM005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVM005
			p-Chlorophenylmethyl Sulfonate	LT 3. -01	ug/g	BVM005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVM005
			Chromium	LT 6.53+00	ug/g	BVJ006
			Copper	3.35+01	ug/g	BVJ006
			Dibromochloropropane	LT 3. -01	ug/g	BVM005
			Dibromochloropropane	7.4 +01	ug/g	BV0003
			Dicyclopentadiene	LT 1. +00	ug/g	BVM005
			Dicyclopentadiene	LT 7. -01	ug/g	BV0003
			Vasone	LT 3. +00	ug/g	BVM005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVM005
			Dithiane	LT 4. -01	ug/g	BVM005
			Dieldrin	LT 3. -01	ug/g	BVM005
			Dimethyldisulfide	LT 2. +01	ug/g	BV0003
			Endrin	LT 5. -01	ug/g	BVM005
			Ethylbenzene	LT 4. -01	ug/g	BV0003
			Mercury	LT 5.00-02	ug/g	BV0016
			Isodrin	LT 3. -01	ug/g	BVM005
			Toluene	3.1 +00	ug/g	BV0003
			Methylisobutyl Ketone	4.5 +00	ug/g	BV0003
			Malathion	LT 7. -01	ug/g	BVM005
			1,4-Oxathiane	LT 3. -01	ug/g	BVM005
			Lead	LT 8.38+00	ug/g	BVJ006
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVM005
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVM005
			Parathion	LT 9. -01	ug/g	BVM005
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6. -01	ug/g	BVM005
			Tetrachloroethene	6.8 -01	ug/g	BV0003
			Thiodiglycol	3.19+00	ug/g	BS1002

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W21	12-13	Soil	Trichloroethene	LT 5. -01	ug/g	BV00003
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BV00003
			Zinc	8.48+01	ug/g	BVJ0006
1001000W21	17-18	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BV00004
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV00004
			1,1-Dichloroethane	LT 2. +00	ug/g	BV00004
			1,2-Dichloroethane	LT 2. +00	ug/g	BV00004
			1,2-Dichloroethane	LT 6. -01	ug/g	BV00004
			m-Xylene	LT 8. -01	ug/g	BV00004
			Aldrin	1. +02	ug/g	BVH0006
			Arsenic	1.22+01	ug/g	BVK0007
			Atrazine	3. -01	ug/g	BVH0006
			Bicycloheptadiene	2.4 +00	ug/g	BV00004
			Benzene	LT 3. -01	ug/g	BV00004
			Carbon Tetrachloride	6.5 -01	ug/g	BV00004
			Cadmium	LT 7.36-01	ug/g	BVJ0007
			Methylene Chloride	LT 2. +00	ug/g	BV00004
			Chloroform	9.6 -01	ug/g	BV00004
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVH0006
			Chlorobenzene	LT 2.2 +00	ug/g	BV00004
			Chlordane	LT 2. +00	ug/g	BVH0006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVH0006
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVH0006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVH0006
			Chromium	LT 6.53+00	ug/g	BVJ0007
			Copper	LT 3.67+01	ug/g	BVJ0007
			Dibromochloropropane	5. -01	ug/g	BVH0006
			Dibromochloropropane	6.1 +00	ug/g	BV00004
			Dicyclopentadiene	LT 1. +00	ug/g	BVH0006
			Dicyclopentadiene	LT 7. -01	ug/g	BV00004
			Vapone	LT 3. +00	ug/g	BVH0006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVH0006
			Dithiane	LT 4. -01	ug/g	BVH0006

Note: Results for parameters may appear in more than one analytical fraction.

Esasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W21	17-18	Soil	Dieldrin	8. -01	ug/g	BVM006
			Dimethyldisulfide	LT 2. +01	ug/g	BVM004
			Endrin	LT 5. -01	ug/g	BVM006
			Ethylbenzene	LT 4. -01	ug/g	BVM004
			Mercury	LT 5.00-02	ug/g	BVM017
			Isodrin	1. +01	ug/g	BVM006
			Toluene	LT 3. -01	ug/g	BVM004
			Methylisobutyl Ketone	LT 7. -01	ug/g	BVM004
			Malathion	LT 7. -01	ug/g	BVM006
			1,4-Oxathiane	LT 3. -01	ug/g	BVM006
			Lead	2.45+01	ug/g	BVJ007
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVM006
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVM006
			Parathion	2.5 +01	ug/g	BVM006
1001000W21	22-23	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	3. +00	ug/g	BVM006
			Tetrachloroethene	9.0 -01	ug/g	BVM004
			Thiodiglycol	LT 2.55+00	ug/g	B61003
			Trichloroethene	LT 5. -01	ug/g	BVM004
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVM004
			Zinc	9.94+01	ug/g	BVJ007
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BVM005
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BVM005
			1,1-Dichloroethane	LT 2. +00	ug/g	BVM005
			1,2-Dichloroethane	LT 2. +00	ug/g	BVM005
			1,2-Dichloroethane	LT 6. -01	ug/g	BVM005
			m-Xylene	LT 8. -01	ug/g	BVM005
			Aldrin	LT 3. -01	ug/g	BVM007
			Arsenic	LT 2.50+00	ug/g	BVM006
			Atrazine	LT 3. -01	ug/g	BVM007
			Bicycloheptadiene	LT 4. -01	ug/g	BVM005
			Benzene	LT 3. -01	ug/g	BVM005

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000421	22-23	Soil	Carbon Tetrachloride	LT 3. -01	ug/g	BV0005
			Cadmium	LT 7.36-01	ug/g	BVJ008
			Methylene Chloride	LT 2. +00	ug/g	BV0005
			Chloroform	8.4 -01	ug/g	BV0005
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BV0007
			Chlorobenzene	LT 1. +00	ug/g	BV0005
			Chlordane	LT 2. +00	ug/g	BV0007
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BV0007
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BV0007
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BV0007
			Chromium	LT 6.53+00	ug/g	BVJ008
			Copper	4.01+01	ug/g	BVJ008
			Dibromochloropropane	LT 3. -01	ug/g	BV0007
			Dibromochloropropane	LT 2. +00	ug/g	BV0005
			Dicyclopentadiene	LT 1. +00	ug/g	BV0007
			Dicyclopentadiene	LT 7. -01	ug/g	BV0005
			Vapona	LT 3. +00	ug/g	BV0007
			Oliisobopylmethyl Phosphonate	LT 1. +00	ug/g	BV0007
			Dithiane	LT 4. -01	ug/g	BV0007
			Dieldrin	LT 3. -01	ug/g	BV0007
			Dimethyldisulfide	LT 2. +01	ug/g	BV0005
			Endrin	LT 5. -01	ug/g	BV0007
			Ethylbenzene	LT 4. -01	ug/g	BV0005
			Mercury	LT 5.00-02	ug/g	BV0018
			Isodrin	LT 3. -01	ug/g	BV0007
			Toluene	LT 3. -01	ug/g	BV0005
			Methylisobutyl Ketone	LT 7. -01	ug/g	BV0005
			Malathion	LT 7. -01	ug/g	BV0007
			1,4-Oxathiane	LT 3. -01	ug/g	BV0007
			Lead	1.64+01	ug/g	BVJ008
			Nichlorodiphenylethane	LT 6. -01	ug/g	BV0007
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BV0007
			Parathion	LT 9. -01	ug/g	BV0007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000421	22-23	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVM007
			Tetrachloroethene	LT 3. -01	ug/g	BV0005
			Thiodiglycol	LT 2.55+00	ug/g	BB1004
			Trichloroethene	LT 5. -01	ug/g	BV0005
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BV0005
			Zinc	8.91+01	ug/g	BVJ008
1001000421	27-28	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BV0006
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV0006
			1,1-Dichloroethane	LT 2. +00	ug/g	BV0006
			1,2-Dichloroethane	LT 2. +00	ug/g	BV0006
			1,2-Dichloroethane	LT 6. -01	ug/g	BV0006
			m-Xylene	LT 8. -01	ug/g	BV0006
			Aldrin	1. +01	ug/g	BVM008
			Arsenic	LT 2.50+00	ug/g	BVK009
			Atrazine	LT 3. -01	ug/g	BVM008
			Bicycloheptadiene	LT 4. -01	ug/g	BV0006
			Benzene	9.8 -01	ug/g	BV0006
			Carbon Tetrachloride	LT 3. -01	ug/g	BV0006
			Cadmium	LT 7.36-01	ug/g	BVJ009
			Methylene Chloride	LT 2. +00	ug/g	BV0006
			Chloroform	7.0 +00	ug/g	BV0006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVM008
			Chlorobenzene	LT 1. +00	ug/g	BV0006
			Chlordane	LT 2. +00	ug/g	BVM008
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVM008
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVM008
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVM008
			Chromium	LT 6.53+00	ug/g	BVJ009
			Copper	4.18+01	ug/g	BVJ009
			Dibromochloropropane	4. -01	ug/g	BVM008
			Dibromochloropropane	LT 2. +00	ug/g	BV0006
			Dicyclopentadiene	LT 1. +00	ug/g	BVM008

Note: Results for some parameters may appear in more than one analytical fraction.

Fluoro Services Incorporated

Summary of Analytical Results

Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

01/27/88

Jack 10

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W21	27-28	Soil	Dicyclopentadiene	LT 7. -01	ug/g	BV0006
			Vapors	LT 3. +00	ug/g	BV0008
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BV0008
			Dithiane	LT 4. -01	ug/g	BV0008
			Dieldrin	1. +00	ug/g	BV0008
			Dimethyldisulfide	LT 2. +01	ug/g	BV0006
			Endrin	LT 5. -01	ug/g	BV0008
			Ethylbenzene	LT 4. -01	ug/g	BV0006
			Mercury	LT 5.00-02	ug/g	BV0019
			Isodrin	LT 3. -01	ug/g	BV0008
			Toluene	5.1 -01	ug/g	BV0006
			Methylisobutyl Ketone	LT 7. -01	ug/g	BV0006
			Malathion	LT 7. -01	ug/g	BV0008
			1,4-Oxethiane	LT 3. -01	ug/g	BV0008
			Lead	1.43+01	ug/g	BVJ009
1001000W25	6.9-7.9	Soil	Dichlorodiphenylethane	LT 6. -01	ug/g	BV0008
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BV0008
			Parathion	LT 9. -01	ug/g	BV0008
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	4. +00	ug/g	BV0008
			Tetrachloroethene	LT 3. -01	ug/g	BV0006
			Thiodiglycol	LT 2.55+00	ug/g	BSI005
			Trichloroethene	LT 5. -01	ug/g	BV0006
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BV0006
			Zinc	9.90+01	ug/g	BVJ009
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BV0002
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV0002
			1,1-Dichloroethane	LT 2. +00	ug/g	BV0002
			1,2-Dichloroethane	LT 2. +00	ug/g	BV0002
			1,2-Dichloroethane	LT 6. -01	ug/g	BV0002
			m-Xylene	9.9 +01	ug/g	BV0002
1001000W25	6.9-7.9	Soil	Aldrin	1. +04	ug/g	BV0003
			Arsenic	1.25+02	ug/g	BMF011

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W25	6.9-7.9	Soil	Atrazine	LT 3. -01	ug/g	BVP003
			Bicycloheptadiene	1.9 +01	ug/g	BVW002
			Benzene	1.7 +01	ug/g	BVW002
			Carbon Tetrachloride	1.8 +01	ug/g	BVW002
			Cadmium	4.98+00	ug/g	BVW005
			Methylene Chloride	5.9 +00	ug/g	BVW002
			Chloroform	3.5 +02	ug/g	BVW002
			Hexachlorocyclopentadiene	9. +01	ug/g	BVP003
			Chloroacetic Acid	2.32+02	ug/g	BVW006
			Chlorobenzene	1.7 +01	ug/g	BVW002
			Chlordane	LT 6. -01	ug/g	BVP003
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BVP003
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BVP003
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BVP003
			Chromium	1.17+01	ug/g	BVW005
			Copper	4.21+01	ug/g	BVW005
			Dibromochloropropane	1. +04	ug/g	BVP003
			Dibromochloropropane	6.0 +03	ug/g	BVW002
			Dicyclopentadiene	LT 4. -01	ug/g	BVP003
			Dicyclopentadiene	LT 7. -01	ug/g	BVW002
			Vapona	LT 3. -01	ug/g	BVP003
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BVP003
			Dithiane	LT 7. +00	ug/g	BVP003
			Dieldrin	1. +02	ug/g	BVP003
			Dimethyldisulfide	LT 2. +01	ug/g	BVW002
			Endrin	LT 3. -01	ug/g	BVP003
			Ethylbenzene	2.0 +01	ug/g	BVW002
			Mercury	8.84+00	ug/g	BVW006
			Isodrin	3. +02	ug/g	BVP003
			Toluene	2.8 +02	ug/g	BVW002
			Methylisobutyl Ketone	LT 7. -01	ug/g	BVW002
			Malathion	LT 3. -01	ug/g	BVP003
			1,4-Oxathiane	LT 6. +00	ug/g	BVP003
			Lead	2.16+01	ug/g	BVW005

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000425	6.9-7.9	Soil	Dichlorodiphenylethane	LT 3. -01	ug/g	BVP003
			Dichlorodiphenyltrichloroethane	7. +01	ug/g	BVP003
			Parathion	LT 4. -01	ug/g	BVP003
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	BVP003
			Tetrachloroethene	3.7 +01	ug/g	BVM002
			Thiodiglycol	1.44+01	ug/g	BVM006
			Trichloroethene	LT 5. -01	ug/g	BVM002
			Ortho- & Para-Xylene	4. +01	ug/g	BVM002
			Zinc	9.20+01	ug/g	BVM005
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BVM003
1001000425	11.8-12.8	Soil	1,1,2-Trichloroethane	LT 4. -01	ug/g	BVM003
			1,1-Dichloroethane	LT 2. +00	ug/g	BVM003
			1,2-Dichloroethane	LT 2. +00	ug/g	BVM003
			1,2-Dichloroethane	LT 6. -01	ug/g	BVM003
			m-Xylene	1.1 +00	ug/g	BVM003
			Aldrin	2. +02	ug/g	BVP004
			Arsenic	LT 2.50+00	ug/g	BVP012
			Atrazine	LT 3. -01	ug/g	BVP004
			Bicycloheptadiene	8.0 +00	ug/g	BVM003
			Benzene	1.2 +00	ug/g	BVM003
			Carbon Tetrachloride	3.6 +00	ug/g	BVM003
			Cadmium	LT 7.36-01	ug/g	BVM006
			Methylene Chloride	8.5 +00	ug/g	BVM003
			Chloroform	6.0 +00	ug/g	BVM003
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BVP004
			Chloroacetic Acid	LT 3.55+01	ug/g	BVM007
			Chlorobenzene	LT 1. +00	ug/g	BVM003
			Chlordane	LT 6. -01	ug/g	BVP004
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BVP004
			p-Chlorophenylmethyl Sulfonide	LT 7. +00	ug/g	BVP004
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BVP004
			Chromium	LT 6.53+00	ug/g	BVM006

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000425	11.8-12.8	Soil	Copper	4.26+01	ug/g	BV0006
			Dibromochloropropane	8. +01	ug/g	BV0004
			Dibromochloropropane	1.7 +03	ug/g	BV0003
			Dicyclopentadiene	LT 4. -01	ug/g	BV0004
			Dicyclopentadiene	LT 7. -01	ug/g	BV0003
			Vapone	LT 3. -01	ug/g	BV0004
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BV0004
			Dithiane	LT 7. +00	ug/g	BV0004
			Diethrin	LT 3. -01	ug/g	BV0004
			Dimethyldisulfide	LT 2. +01	ug/g	BV0003
			Endrin	LT 3. -01	ug/g	BV0004
			Ethylbenzene	LT 4. -01	ug/g	BV0003
			Mercury	6.53-02	ug/g	BV0007
			Isodrin	LT 3. -01	ug/g	BV0004
			Toluene	6.9 +00	ug/g	BV0003
			Methylisobutyl Ketone	LT 7. -01	ug/g	BV0003
			Malathion	LT 3. -01	ug/g	BV0004
			1,4-Oxathiane	LT 6. +00	ug/g	BV0004
			Lead	1.75+01	ug/g	BV0006
			Dichlorodiphenylethane	LT 3. -01	ug/g	BV0004
1001000425	16.2-17.2	Soil	Dichlorodiphenyltrichloroethane	5. +00	ug/g	BV0004
			Parathion	LT 4. -01	ug/g	BV0004
			2-Chloro-1(2,4-Dichlorophenyl)	LT 3. -01	ug/g	BV0004
			Vinylidethyl Phosphates			
			Tetrachloroethene	LT 4.7 +00	ug/g	BV0003
			Thiodiglycol	LT 4.20+00	ug/g	BV0007
			Trichloroethene	LT 5. -01	ug/g	BV0003
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BV0003
			Zinc	8.49+01	ug/g	BV0006
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BV0004
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BV0004
			1,1-Dichloroethane	LT 2. +00	ug/g	BV0004
			1,2-Dichloroethane	LT 2. +00	ug/g	BV0004

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W25	16.2-17.2	Soil	1,2-Dichloroethane	LT 6. -01	ug/g	BVA004
			m-Xylene	LT 8. -01	ug/g	BVA004
			Aldrin	LT 3. -01	ug/g	BVP005
			Arsenic	LT 2.50+00	ug/g	BAF013
			Atrazine	LT 3. -01	ug/g	BVP005
			Bicycloheptadiene	LT 4. -01	ug/g	BVA004
			Benzene	LT 3. -01	ug/g	BVA004
			Carbon Tetrachloride	LT 3. -01	ug/g	BVA004
			Cadmium	LT 7.36-01	ug/g	BVP007
			Diethylene Chloride	LT 2. +00	ug/g	BVA004
			Chloroform	LT 3. -01	ug/g	BVA004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BVP005
			Hexoacetic Acid	LT 3.55+01	ug/g	BVP008
			Chlorobenzene	LT 1. +00	ug/g	BVA004
			Chlordane	LT 6. -01	ug/g	BVP005
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BVP005
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BVP005
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BVP005
			Chromium	1.08+01	ug/g	BVP007
			Copper	3.84+01	ug/g	BVP007
			Dibromochloropropane	LT 3. -01	ug/g	BVP005
			Dibromochloropropene	LT 2. +00	ug/g	BVA004
			Dicyclopentadiene	LT 4. -01	ug/g	BVP005
			Dicyclopentadiene	LT 7. -01	ug/g	BVA004
			Vapone	LT 3. -01	ug/g	BVP005
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BVP005
			Dithiane	LT 7. +00	ug/g	BVP005
			Dieldrin	LT 3. -01	ug/g	BVP005
			Dimethyldisulfide	LT 2. +01	ug/g	BVA004
			Endrin	LT 3. -01	ug/g	BVP005
			Ethylbenzene	LT 4. -01	ug/g	BVA004
			Mercury	LT 5.00-02	ug/g	BAF008
			Isodrin	LT 3. -01	ug/g	BVP005
			Toluene	LT 3. -01	ug/g	BVA004

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W25	16.2-17.2	Soil	Methylisobutyl Ketone	LT 7. -01	ug/g	BVW004
			Malathion	LT 3. -01	ug/g	BVP005
			1,4-Oxathiane	LT 6. +00	ur/g	BVP005
			Lead	LT 8.38+00	ug/g	BVP007
			Dichlorodiphenylethane	LT 3. -01	ug/g	BVP005
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	BVP005
			Parathion	LT 4. -01	ug/g	BVP005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BVP005
			Tetrachloroethene	LT 3. -01	ug/g	BVW004
			1,1,1,2-Tetrachloroethane	LT 4.20+00	ug/g	BVW008
			Trichloroethene	LT 5. -01	ug/g	BVW004
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVW004
			Zinc	9.49+01	ug/g	BVP007
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BVW005
1001000W25	21.1-22.1	Soil	1,1,2-Trichloroethane	LT 4. -01	ug/g	BVW005
			1,1,2-Dichloroethane	LT 4. -01	ug/g	BVW005
			1,1-Dichloroethane	LT 2. +00	ug/g	BVW005
			1,2-Dichloroethane	LT 2. +00	ug/g	BVW005
			m-Xylene	LT 6. -01	ug/g	BVW005
			Aldrin	LT 8. -01	ug/g	BVW005
			Arsenic	LT 3. -01	ug/g	BVP006
			ATrazine	LT 2.50+00	ug/g	BLF014
			Bicycloheptadiene	LT 3. -01	ug/g	BVP006
			Benzene	LT 4. -01	ug/g	BVW005
			Carbon Tetrachloride	LT 3. -01	ug/g	BVW005
			Cadmium	LT 3. -01	ug/g	BVW005
			Methylene Chloride	LT 7.36-01	ug/g	BVW008
			Chloroform	LT 2. +00	ug/g	BVW005
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BVW005
			Chloroacetic Acid	LT 3. -01	ug/g	BVP006
			Chlorobenzene	LT 3.55+01	ug/g	BVW009
			Chlordane	LT 1. +00	ug/g	BVW005
				LT 6. -01	ug/g	BVP006

Note: Results for some parameters may appear in more than one analytical fraction.

Fluoro Services Incorporated Rocky Mountain Arsenal Program 01/27/88

Summary of Analytical Results Task 10 Chemical Severs -- South Plants

Barling Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000425	21.1-22.1	Soil	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BVP006
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BVP006
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BVP006
			Chromium	LT 6.53+00	ug/g	BVV008
			Copper	LT 3.69+01	ug/g	BVV008
			Dibromochloropropane	LT 3. -01	ug/g	BVP006
			Dibromochloropropane	LT 2. +00	ug/g	BVV005
			Dicyclopentadiene	LT 4. -01	ug/g	BVP006
			Dicyclopentadiene	LT 7. -01	ug/g	BVV005
			Vapors	LT 3. -01	ug/g	BVP006
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BVP006
			Dithiane	LT 7. +00	ug/g	BVP006
			Diethrin	LT 3. -01	ug/g	BVP006
			Dimethyldisulfide	LT 2. +01	ug/g	BVV005
			Endrin	LT 3. -01	ug/g	BVP006
			Ethylbenzene	LT 4. -01	ug/g	BVV005
			Mercury	LT 5.00-02	ug/g	BVE009
			Isodrin	LT 3. -01	ug/g	BVP006
			Toluene	LT 3. -01	ug/g	BVV005
			Methylisobutyl Ketone	LT 7. -01	ug/g	BVV005
			Malethion	LT 3. -01	ug/g	BVP006
			1,4-Oxathiane	LT 6. +00	ug/g	BVP006
			Lead	LT 1.42+01	ug/g	BVV008
			Dichlorodiphenylethane	LT 3. -01	ug/g	BVP006
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	BVP006
			Parathion	LT 4. -01	ug/g	BVP006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BVP006
			Tetrachloroethene	LT 3. -01	ug/g	BVV005
			Thiodiglycol	LT 4.20+00	ug/g	BVV009
			Trichloroethene	LT 5. -01	ug/g	BVV005
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVV005
			Zinc	LT 9.53+01	ug/g	BVV008

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W25	26.2-27.2	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BVM006
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BVM006
			1,1-Dichloroethane	LT 2. +00	ug/g	BVM006
			1,2-Dichloroethane	LT 2. +00	ug/g	BVM006
			1,2-Dichloroethane	LT 6. -01	ug/g	BVM006
			m-Xylene	LT 8. -01	ug/g	BVM006
			Arsenic	LT 2.50+00	ug/g	BMF015
			Bicycloheptadiene	LT 4. -01	ug/g	BVM006
			Benzene	LT 3. -01	ug/g	BVM006
			Carbon Tetrachloride	LT 3. -01	ug/g	BVM006
			Cadmium	LT 7.36-01	ug/g	BVM009
			Methylene Chloride	LT 2. +00	ug/g	BVM006
			Chloroform	LT 1.4 +00	ug/g	BVM006
			Chloroacetic Acid	LT 3.55+01	ug/g	BVM010
			Chlorobenzene	LT 1. +00	ug/g	BVM006
			Chromium	1.62+01	ug/g	BVM009
			Copper	2.60+01	ug/g	BVM009
			Dibromochloropropane	LT 2. +00	ug/g	BVM006
			Dicyclopentadiene	LT 7. -01	ug/g	BVM006
			Dimethyldisulfide	LT 2. +01	ug/g	BVM006
			Ethylbenzene	LT 4. -01	ug/g	BVM006
			Mercury	LT 5.00-02	ug/g	BMF010
			Toluene	LT 3. -01	ug/g	BVM006
			Methylisobutyl Ketone	LT 7. -01	ug/g	BVM006
			Lead	1.83+01	ug/g	BVM009
			Tetrachloroethene	LT 3. -01	ug/g	BVM006
			Thiodiglycol	LT 4.20+00	ug/g	BVM010
			Trichloroethene	LT 5. -01	ug/g	BVM006
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVM006
			Zinc	1.13+02	ug/g	BVM009
1001000W27	6.5-7.5	Soil	1,1,1-Trichloroethane	LT 4. -01	ug/g	BVM007
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BVM007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000427	6.5-7.5	Soil	1,1-Dichloroethane	LT 2. +00	ug/g	BVW007
			1,2-Dichloroethane	LT 2. +00	ug/g	BVW007
			1,2-Dichloroethane	LT 6. -01	ug/g	BVW007
			m-Xylene	LT 8. -01	ug/g	BVW007
			Aldrin	LT 1. +02	ug/g	BVZ002
			Arsenic	1.54+01	ug/g	BWF006
			Atrazine	LT 3. -01	ug/g	BVZ002
			Bicycloheptadiene	2.3 +00	ug/g	BVW007
			Benzene	LT 3. -01	ug/g	BVW007
			Carbon Tetrachloride	LT 3. -01	ug/g	BVW007
			Cadmium	LT 7.36-01	ug/g	BVV010
			Methylene Chloride	LT 2. +00	ug/g	BVW007
			Chloroform	LT 3. -01	ug/g	BVW007
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ002
			Chloroacetic Acid	LT 3.55+01	ug/g	BVW011
			Chlorobenzene	LT 1. +00	ug/g	BVW007
			Chlordane	LT 2. +00	ug/g	BVZ002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ002
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ002
			Chromium	1.57+01	ug/g	BVV010
			Copper	4.05+01	ug/g	BVV010
			Dibromochloropropane	LT 7.9 +00	ug/g	BVW007
			Dibromochloropropane	1. +01	ug/g	BVZ002
			Dicyclopentadiene	LT 7. -01	ug/g	BVW007
			Dicyclopentadiene	LT 1. +00	ug/g	BVZ002
			Vapona	LT 3. +00	ug/g	BVZ002
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ002
			Dithiane	LT 4. -01	ug/g	BVZ002
			Dieldrin	9. +01	ug/g	BVZ002
			Dimethyldisulfide	LT 2. +01	ug/g	BVW007
			Endrin	LT 5. -01	ug/g	BVZ002
			Ethylbenzene	LT 4. -01	ug/g	BVW007
			Mercury	2.04+00	ug/g	BWF011

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000427	6.5-7.5	Soil	Isodrin	LT 3. -01	ug/g	BVZ002
			Toluene	LT 3. -01	ug/g	BVW007
			Methylisobutyl Ketone	LT 7. -01	ug/g	BVW007
			Malethion	LT 7. -01	ug/g	BVZ002
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ002
			Lead	4.89+01	ug/g	BVW010
			Dichlorodiphenylethane	2. +00	ug/g	BVZ002
			Dichlorodiphenyltrichloroethane	2.5 +01	ug/g	BVZ002
			Parathion	LT 9. -01	ug/g	BVZ002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVZ002
1001000427	11.5-12.5	Soil	Tetrachloroethene	4.1 +00	ug/g	BVW007
			Thiodiethylcol	LT 4.20+00	ug/g	BVW011
			Trichloroethene	LT 5. -01	ug/g	BVW007
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVW007
			Zinc	1.28+02	ug/g	BVW010
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BVW008
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BVW008
			1,1-Dichloroethane	LT 2. +00	ug/g	BVW008
			1,2-Dichloroethane	LT 2. +00	ug/g	BVW008
			n-Xylene	LT 8. -01	ug/g	BVW008
			Aldrin	8.8 +01	ug/g	BVZ003
			Arsenic	LT 2.50+00	ug/g	BAF007
			Atrazine	LT 3. -01	ug/g	BVZ003
			Bicycloheptadiene	LT 2.7 +01	ug/g	BVW008
			Benzene	1.4 +00	ug/g	BVW008
			Carbon Tetrachloride	2.0 +01	ug/g	BVW008
			Cadmium	LT 7.36-01	ug/g	BVW011
			Methylene Chloride	LT 2. +00	ug/g	BVW008
			Chloroform	5.1 +00	ug/g	BVW008
			Hexachlorocyclopentadiene	8. -01	ug/g	BVZ003

Note: Results for some parameters may appear in more than one analytical fraction.

Elasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Truck 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W27	11.5-12.5	Soil	Chloroacetic Acid	LT 3.55+01	ug/g	BV0012
			Chlorobenzene	LT 1. -00	ug/g	BV4008
			Chlordane	LT 2. +00	ug/g	BV2003
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BV2003
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BV2003
			p-Chlorophenylmethyl Sulfone	3. -01	ug/g	BV2003
			Chromium	1.66+01	ug/g	BV0011
			Copper	3.57+01	ug/g	BV0011
			Dibromochloropropane	1.6 +02	ug/g	BV4008
			Dibromochloropropane	5. +01	ug/g	BV2003
			Dicyclopentadiene	LT 7. -01	ug/g	BV4008
			Dicyclopentadiene	LT 1. +00	ug/g	BV2003
			Vapona	LT 3. +00	ug/g	BV2003
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BV2003
			Dithiane	LT 4. -01	ug/g	BV2003
			Dieldrin	2. +00	ug/g	BV2003
			Dimethyldisulfide	LT 2. +01	ug/g	BV4008
			Endrin	LT 5. -01	ug/g	BV2003
			Ethylbenzene	LT 4. -01	ug/g	BV4008
			Mercury	6.14-02	ug/g	BV0012
			Isodrin	6. +00	ug/g	BV2003
			Toluene	4.7 +01	ug/g	BV4008
			Methylisobutyl Ketone	LT 7. -01	ug/g	BV4008
			Malathion	LT 7. -01	ug/g	BV2003
			1,4-Oxathiane	LT 3. -01	ug/g	BV2003
			Lead	2.38+01	ug/g	BV0011
			Dichlorodiphenylethane	LT 6. -01	ug/g	BV2003
			Dichlorodiphenyltrichloroethane	2. +00	ug/g	BV2003
			Parathion	LT 9. -01	ug/g	BV2003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	2. +00	ug/g	BV2003
			Tetrachloroethene	1.2 +01	ug/g	BV4008
			Thiodiglycol	LT 4.20+00	ug/g	BV0012

Note: Results for some parameters may appear in more than one analytical fraction.

Fresco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000427	11.5-12.5	Soil	Trichloroethene	LT 5. -01	ug/g	BVW008
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BVW008
			Zinc	1.01+02	ug/g	BVW011
1001000427	16.2-17.2	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	BMC002
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BMC002
			1,1-Dichloroethane	LT 9. -01	ug/g	BMC002
			1,2-Dichloroethane	LT 3. -01	ug/g	BMC002
			1,2-Dichloroethane	LT 3. -01	ug/g	BMC002
			m-Xylene	LT 7. -01	ug/g	BMC002
			Aldrin	1. +02	ug/g	BVZ004
			Arsenic	LT 2.50+00	ug/g	BVZ004
			Atrazine	LT 3. -01	ug/g	BVZ004
			Bicycloheptadiene	4. +00	ug/g	BMC002
			Benzene	LT 3. -01	ug/g	BMC002
			Carbon Tetrachloride	1. +01	ug/g	BMC002
			Cadmium	LT 7.36-01	ug/g	BVW012
			Methylene Chloride	2. +00	ug/g	BMC002
			Chloroform	1.1 +01	ug/g	BMC002
			Hexachlorocyclopentadiene	7. -01	ug/g	BVZ004
			Chloroacetic Acid	LT 3.55+01	ug/g	BVW013
			Chlorobenzene	LT 3. -01	ug/g	BMC002
			Chlordane	LT 2. +00	ug/g	BVZ004
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ004
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ004
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ004
			Chromium	7.19+01	ug/g	BVW012
			Copper	3.79+01	ug/g	BVW012
			Dibromochloropropane	1. +02	ug/g	BVZ004
			Dibromochloropropane	3.5 +02	ug/g	BMC002
			Dibromocyclopentadiene	LT 1. +00	ug/g	BVZ004
			Dibromocyclopentadiene	LT 3. -01	ug/g	BMC002
			Vapona	LT 3. +00	ug/g	BVZ004
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ004

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W27	16.2-17.2	Soil	Dithiane	LT 4. -01	ug/g	BVZ004
			Dieldrin	1. +00	ug/g	BVZ004
			Dimethyldisulfide	LT 8. -01	ug/g	BAC002
			Endrin	LT 5. -01	ug/g	BVZ004
			Ethylbenzene	LT 3. -01	ug/g	BAC002
			Mercury	LT 5.00-02	ug/g	BAC013
			Isodrin	3. +00	ug/g	BVZ004
			Toluene	1. +01	ug/g	BAC002
			Methylisobutyl Ketone	LT 3. -01	ug/g	BAC002
			Malathion	LT 7. -01	ug/g	BVZ004
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ004
			Lead	LT 8.38+00	ug/g	BVV012
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ004
			Dichlorodiphenyltrichloro-ethane	LT 8. -01	ug/g	BVZ004
			Parathion	LT 9. -01	ug/g	BVZ004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	7. -01	ug/g	BVZ004
			Tetrachloroethene	9. -01	ug/g	BAC002
			Triodiglycol	LT 4.20+00	ug/g	BV0013
			Trichloroethene	LT 3. -01	ug/g	BAC002
1001000W27	21.2-22.2	Soil	Ortho- & Para-Xylene	LT 3. -01	ug/g	BAC002
			Zinc	8.36+01	ug/g	BVV012
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BAC003
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BAC003
			1,1-Dichloroethane	LT 9. -01	ug/g	BAC003
			1,2-Dichloroethane	LT 3. -01	ug/g	BAC003
			1,2-Dichloroethane	LT 3. -01	ug/g	BAC003
			m-Xylene	LT 7. -01	ug/g	BAC003
			Aldrin	LT 3. -01	ug/g	BVZ005
			Arsenic	LT 2.50+00	ug/g	BAC009
			Atrazine	LT 3. -01	ug/g	BVZ005
			Bicycloheptadiene	1. +00	ug/g	BAC003

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000427	21.2-22.2	Soil	Benzene	LT 3. -01	ug/g	BAC003
			Carbon Tetrachloride	2. +00	ug/g	BAC003
			Cadmium	LT 7.36-01	ug/g	BV0013
			Methylene Chloride	2. +00	ug/g	BAC003
			Chloroform	7. +00	ug/g	BAC003
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BV2005
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0014
			Chlorobenzene	LT 3. -01	ug/g	BAC003
			Chlordane	LT 2. +00	ug/g	BV2005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BV2005
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BV2005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BV2005
			Chromium	1.02+01	ug/g	BV0013
			Copper	4.13+01	ug/g	BV0013
			Dibromochloropropane	9. +00	ug/g	BV2005
			Dibromochloropropane	3. +01	ug/g	BAC003
			Dibromochloropropane	LT 1. +00	ug/g	BV2005
			Dibromochloropropane	LT 3. -01	ug/g	BAC003
			Dibromochloropropane	LT 3. +00	ug/g	BV2005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BV2005
			Dithiane	LT 4. -01	ug/g	BV2005
			Dieldrin	LT 3. -01	ug/g	BV2005
			Dimethyldisulfide	LT 8. -01	ug/g	BAC003
			Endrin	LT 5. -01	ug/g	BV2005
			Ethylbenzene	LT 3. -01	ug/g	BAC003
			Mercury	LT 5.00-02	ug/g	BAC014
			Isodrin	LT 3. -01	ug/g	BV2005
			Toluene	1. +00	ug/g	BAC003
			Methylisobutyl Ketone	LT 3. -01	ug/g	BAC003
			Malathion	LT 9. -01	ug/g	BV2005
			1,4-Oxathiane	LT 3. -01	ug/g	BV2005
			Lead	1.62+01	ug/g	BV0013
			Dichlorodiphenylethane	LT 6. -01	ug/g	BV2005
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BV2005

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000W27	21.2-22.2	Soil	Parathion	LT 9. -01	ug/g	BVZ005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVZ008
			Tetrachloroethene	LT 3. -01	ug/g	BWC003
			Thiodiglycol	LT 4.20+00	ug/g	BV0014
			Trichloroethene	LT 3. -01	ug/g	BWC003
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BWC003
1001000W27	26.2-27.2	Soil	Zinc	8.61+01	ug/g	BV0013
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BWC004
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BWC004
			1,1-Dichloroethane	LT 9. -01	ug/g	BWC004
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC004
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC004
			m-Xylene	LT 7. -01	ug/g	BWC004
			Aldrin	7. +00	ug/g	BVZ006
			Arsenic	LT 2.50+00	ug/g	BWF010
			Atrazine	LT 3. -01	ug/g	BVZ006
			Bicycloheptadiene	LT 2. +00	ug/g	BWC004
			Benzene	LT 3. -01	ug/g	BWC004
			Carbon Tetrachloride	LT 4. +00	ug/g	BWC004
			Cadmium	LT 7.36-01	ug/g	BV0014
			Methylene Chloride	3. +00	ug/g	BWC004
			Chloroform	1. +01	ug/g	BWC004
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ006
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0015
			Chlorobenzene	LT 3. -01	ug/g	BWC004
			Chloroform	LT 2. +00	ug/g	BVZ006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ006
			p-Chlorophenylmethyl Sulfonate	LT 3. -01	ug/g	BVZ006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ006
			Chromium	1.37+01	ug/g	BV0014
			Copper	3.93+01	ug/g	BV0014
			Dibromochloropropane	LT 3. -01	ug/g	BVZ006

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers --- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001000427	26.2-27.2	Soil	Dibromochloropropane	LT 3. +01	ug/g	BMC004
			Dicyclopentadiene	LT 1. +00	ug/g	SVZ006
			Dicyclopentadiene	LT 3. -01	ug/g	BMC004
			Vapona	LT 3. +00	ug/g	SVZ006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	SVZ006
			Dithiane	LT 4. -01	ug/g	SVZ006
			Dieldrin	LT 3. -01	ug/g	SVZ006
			Dimethyldisulfide	LT 8. -01	ug/g	BMC004
			Endrin	LT 5. -01	ug/g	SVZ006
			Ethylbenzene	LT 3. -01	ug/g	BMC004
			Mercury	LT 5.00-02	ug/g	BME015
			Isodrin	LT 3. -01	ug/g	SVZ006
			Toluene	LT 3. +00	ug/g	BMC004
			Methylisobutyl Ketone	LT 3. -01	ug/g	BMC004
			Malathion	LT 7. -01	ug/g	SVZ006
1001CS0101	4-5	Soil	1,4-Oxathiane	LT 3. -01	ug/g	SVZ006
			Lead	2.32+01	ug/g	SVZ014
			Dichlorodiphenylethane	LT 6. -01	ug/g	SVZ006
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	SVZ006
			Parathion	LT 9. -01	ug/g	SVZ006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	SVZ006
			Tetrachloroethene	LT 3. -01	ug/g	BMC004
			Thiodiglycol	LT 4.20+00	ug/g	SVZ015
			Trichloroethene	LT 3. -01	ug/g	BMC004
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BMC004
			Zinc	9.31+01	ug/g	SVZ014
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1003
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1003
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1003
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1003
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1003

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0101	4-5	Soil	m-Xylene	LT 7. -01	ug/g	BZ1003
			Arsenic	9.50+00	ug/g	BY2018
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1003
			Benzene	LT 3. -01	ug/g	BZ1003
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1003
			Cadmium	LT 7.36-01	ug/g	BZE010
			Methylene Chloride	2. +00	ug/g	BZ1003
			Chloroform	LT 3. -01	ug/g	BZ1003
			Chloroacetic Acid	LT 3.55+01	ug/g	BZJ006
			Chlorobenzene	LT 3. -01	ug/g	BZ1003
			Chromium	1.08+01	ug/g	BZE010
			Copper	4.03+01	ug/g	BZE010
			Dibromochloropropane	LT 4. -01	ug/g	BZ1003
			Dicyclopentadiene	LT 3. -01	ug/g	BZ1003
			Dimethyldisulfide	LT 8. -01	ug/g	BZ1003
			Ethylbenzene	LT 3. -01	ug/g	BZ1003
1001CS0102	4-5	Soil	Mercury	1.02-01	ug/g	BZF010
			Toluene	LT 3. -01	ug/g	BZ1003
			Methylisobutyl Ketone	LT 3. -01	ug/g	BZ1003
			Lead	LT 8.38+00	ug/g	BZE010
			Tetrachloroethene	1. +00	ug/g	BZ1003
			Thiodiglycol	LT 4.20+00	ug/g	BZJ006
			Trichloroethene	LT 3. -01	ug/g	BZ1003
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZ1003
			Zinc	1.39+02	ug/g	BZE010
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1004
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1004
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1004
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1004
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1004
			m-Xylene	LT 7. -01	ug/g	BZ1004
			Aldrin	LT 3. -01	ug/g	BZD009
			Arsenic	6.49+00	ug/g	BY2017

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Insk 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0102	4-5	Soil	Atrazine	LT 3. -01	ug/g	BZD009
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1004
			Benzene	LT 3. -01	ug/g	BZ1004
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1004
			Cadmium	LT 7.36-01	ug/g	BZE009
			Methylene Chloride	LT 7. -01	ug/g	BZ1004
			Chloroform	LT 3. -01	ug/g	BZ1004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BZD009
			Chloroacetic Acid	LT 3.55+01	ug/g	BZJ005
			Chlorobenzene	LT 3. -01	ug/g	BZ1004
			Chlordane	LT 6. -01	ug/g	BZD009
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BZD009
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BZD009
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BZD009
			Chromium	1.52+01	ug/g	BZE009
			Copper	3.52+01	ug/g	BZE009
			Dibromochloropropane	LT 3. -01	ug/g	BZD009
			Dibromochloropropane	LT 4. -01	ug/g	BZ1004
			Dicyclopentadiene	LT 4. -01	ug/g	BZD009
			Dicyclopentadiene	LT 3. -01	ug/g	BZ1004
			Vapona	LT 3. -01	ug/g	BZD009
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BZD009
			Dithiane	LT 7. +00	ug/g	BZD009
			Dieldrin	5. -01	ug/g	BZD009
			Dimethyldisulfide	LT 8. -01	ug/g	BZ1004
			Endrin	LT 3. -01	ug/g	BZD009
			Ethylbenzene	LT 3. -01	ug/g	BZ1004
			Mercury	LT 5.00-02	ug/g	BZF009
			Isodrin	LT 3. -01	ug/g	BZD009
			Toluene	LT 3. -01	ug/g	BZ1004
			Methylisobutyl Ketone	LT 3. -01	ug/g	BZ1004
			Malathion	LT 3. -01	ug/g	BZD009
			1,4-Oxathiane	LT 6. +00	ug/g	BZD009
			Lead	LT 8.38+00	ug/g	BZE009

Note: Results for some parameters may appear in more than one analytical fraction.

Fbasco Services Incorporated
 Summary of Analytical Results

Rocky Mountain Arsenal Program
 Task 10 (Chemical Sewers -- South Plants)

01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0102	4-5	Soil	Dichlorodiphenylethane	LT 3. -01	ug/g	BZD009
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	BZD009
			Parathion	LT 4. -01	ug/g	BZD009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BZD009
			Tetrachloroethane	LT 3. -01	ug/g	BZ1004
			Thiodiglycol	LT 4.20+00	ug/g	BZJ005
			Trichloroethane	LT 3. -01	ug/g	BZ1004
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZ1004
			Zinc	1.13+02	ug/g	BZE009
1001CS0103	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1005
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1005
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1005
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1005
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1005
			m-Xylene	LT 7. -01	ug/g	BZ1005
			Aldrin	LT 2.5 -01	ug/g	BZH002
			Arsenic	1.24+01	ug/g	BVZ019
			Atrazine	LT 2.5 -01	ug/g	BZH002
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1005
			Benzene	LT 3. -01	ug/g	BZ1005
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1005
			Cadmium	LT 7.36-01	ug/g	BZE011
			Methylene Chloride	LT 7. -01	ug/g	BZ1005
			Chloroform	LT 3. -01	ug/g	BZ1005
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZH002
			Chloroacetic Acid	LT 3.55+01	ug/g	BZJ007
			Chlorobenzene	LT 3. -01	ug/g	BZ1005
			Chloroform	LT 1.7 +00	ug/g	BZH002
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZH002
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	BZH002
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZH002
			Chromium	1.10+01	ug/g	BZE011

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0103	4-5	Soil	Copper	3.40+01	ug/g	BZE011
			Dibromochloropropane	LT 2.8 -01	ug/g	BZH002
			Dibromochloropropane	LT 4. -01	ug/g	BZI005
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZH002
			Dicyclopentadiene	LT 3. -01	ug/g	BZI005
			Vapona	LT 3.0 +00	ug/g	BZH002
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZH002
			Dithiane	LT 3.6 -01	ug/g	BZH002
			Dieldrin	4.5 -01	ug/g	BZH002
			Dimethyldisulfide	LT 8. -01	ug/g	BZI005
			Endrin	LT 4.6 -01	ug/g	BZH002
			Ethylbenzene	LT 3. -01	ug/g	BZI005
			Mercury	LT 5.00-02	ug/g	BZF011
			Isodrin	LT 2.9 -01	ug/g	BZH002
			Toluene	LT 3. -01	ug/g	BZI005
			Methylisobutyl Ketone	LT 3. -01	ug/g	BZI005
			Malethion	LT 7.1 -01	ug/g	BZH002
			1,4-Oxethiane	LT 2.5 -01	ug/g	BZH002
			Lead	LT 8.38+00	ug/g	BZE011
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZH002
1001CS0104	4-5	Soil	Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZH002
			Parathion	LT 8.5 -01	ug/g	BZH002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZH002
			Tetrachloroethene	LT 3. -01	ug/g	BZI005
			Thiodiglycol	LT 4.20+00	ug/g	BZJ007
			Trichloroethene	LT 3. -01	ug/g	BZI005
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZI005
			Zinc	1.22+02	ug/g	BZE011
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BZI006
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZI006
			1,1-Dichloroethane	LT 9. -01	ug/g	BZI006
			1,2-Dichloroethane	LT 3. -01	ug/g	BZI006

Note: Results for some parameters may appear in more than one analytical fraction.

FRASCO SERVICES INCORPORATED
 Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Test 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
10U1C50104	4-5	Soil	1,2-Dichloroethane	LT 3. -01	ug/g	B21006
			m-Xylene	LT 7. -01	ug/g	B21006
			Aldrin	4.4 -01	ug/g	B2H003
			Arsenic	5.30+00	ug/g	B2H003
			Atrazine	LT 2.5 -01	ug/g	B2H003
			Ricicloheptadiene	LT 3. -01	ug/g	B21006
			Benzene	LT 3. -01	ug/g	B21006
			Carbon Tetrachloride	LT 3. -01	ug/g	B21006
			Cadmium	LT 7.36-01	ug/g	B2E012
			Methylene Chloride	LT 7. -01	ug/g	B21006
			Chloroform	LT 3. -01	ug/g	B21006
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	B2H003
			Chloroacetic Acid	LT 3.55+01	ug/g	B2J008
			Chlorobenzene	LT 3. +00	ug/g	B21006
			Chlordane	LT 1.7 +00	ug/g	B2H003
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	B2H003
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	B2H003
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	B2H003
			Chromium	1.21+01	ug/g	B2E012
			Copper	3.35+01	ug/g	B2E012
			Dibromochloropropane	LT 2.8 -01	ug/g	B2H003
			Dibromochloropropane	LT 4. -01	ug/g	B21006
			Dicyclopentadiene	LT 1.1 +00	ug/g	B2H003
			Dicyclopentadiene	LT 3. +00	ug/g	B21006
			Vapona	LT 3.0 +00	ug/g	B2H003
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	B2H003
			Dithiane	LT 3.6 -01	ug/g	B2H003
			Diethylin	2.7 -01	ug/g	B2H003
			Dimethyldisulfide	LT 8. -01	ug/g	B21006
			Endrin	LT 4.6 -01	ug/g	B2H003
			Ethylbenzene	LT 3. -01	ug/g	B21006
			Mercury	1.57-01	ug/g	B2F012
			Isodrin	LT 2.9 -01	ug/g	B2H003
			Toluene	LT 3. +00	ug/g	B21006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Summary of Analytical Results

Rocky Mountain Arsenal Program

Task 10

Chemical Sewers - South Plants

01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0104	4-5	Soil	Methylisobutyl Ketone	LT 3. -01	ug/g	BZ1006
			Malathion	LT 7.1 -01	ug/g	BZ1003
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZ1003
			Lead	LT 8.38+00	ug/g	BZE012
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZ1003
			Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZ1003
			Parathion	LT 8.5 -01	ug/g	BZ1003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidiehyli Phosphates	LT 6.1 -01	ug/g	BZ1003
			Tetrachloroethene	3. +00	ug/g	BZ1006
			Thiodiglycol	LT 4.20+00	ug/g	BZ1008
1001CS0105	4-5	Soil	Trichloroethene	LT 3. -01	ug/g	BZ1006
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZ1006
			Zinc	1.64+02	ug/g	BZE012
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1007
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1007
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1007
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1007
			m-Xylene	LP 7. -01	ug/g	BZ1007
			Aldrin	LT 2.5 01	ug/g	BZ1004
			Arsenic	1.19+01	ug/g	BZ0201
			Atrazine	LT 2.5 -01	ug/g	BZ1004
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1007
			Benzene	LT 3. -01	ug/g	BZ1007
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1007
			Cadmium	LT 7.36-01	ug/g	BZE013
			Methylene Chloride	LT 7. -01	ug/g	BZ1007
			Chloroform	LT 3. -01	ug/g	BZ1007
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZ1004
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ1009
			Chlorobenzene	LT 3. -01	ug/g	BZ1007
			Chlordane	LT 1.7 +00	ug/g	BZ1004

Note: Results for some parameters may appear in more than one analytical fraction.

Labaco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CSDJ05	4.5	Soil	p-Chlorophenylmethyl Sulfide	LT 2.1 -01	ug/g	BZH004
			p-Chlorophenylmethyl Sulfide	LT 2.5 -01	ug/g	BZH004
			p-Chlorophenylmethyl Sulfide	LT 2.5 -01	ug/g	BZH004
			Chromium	1.33+01	ug/g	BZE013
			Copper	3.33+01	ug/g	BZE013
			Dibromochloropropane	LT 2.8 -01	ug/g	BZH004
			Dibromochloropropane	LT 4. -01	ug/g	BZI007
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZH004
			Dicyclopentadiene	LT 3. -01	ug/g	BZI007
			Vapona	LT 3.0 +00	ug/g	BZH004
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZH004
			Dithiane	LT 3.6 -01	ug/g	BZH004
			Dieldrin	LT 1.5 +00	ug/g	BZH004
			Dimethyldisulfide	LT 8. -01	ug/g	BZI007
			Endrin	LT 4.6 -01	ug/g	BZH004
			Ethylbenzene	LT 3. -01	ug/g	BZI007
			Mercury	7.53-02	ug/g	BZF013
			Isodrin	LT 2.9 -01	ug/g	BZH004
			Toluene	LT 3. -01	ug/g	BZI007
			Methylisobutyl Ketone	LT 3. -01	ug/g	BZI007
			Malathion	LT 7.1 -01	ug/g	BZH004
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZH004
			Lead	LT 8.38+00	ug/g	BZE013
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZH004
			Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZH004
			Parathion	LT 8.5 -01	ug/g	BZH004
			2-Chloro-1(2,4-Dichlorophenyl)	LT 6.1 -01	ug/g	BZH004
			Vinylidethyl Phosphates	5. -01	ug/g	BZI007
			Tetrachloroethene	LT 4.20+00	ug/g	BZI009
			Thiodiglycol	LT 3. -01	ug/g	BZI007
			Trichloroethene	LT 3. -01	ug/g	BZI007
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZI007
			Zinc	1.16+02	ug/g	BZE013

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0106	4-5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1008
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1008
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1008
			1,2-Dichloroethane	LT 01. -01	ug/g	BZ1008
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1008
			m-Xylene	LT 7. -01	ug/g	BZ1008
			Aldrin	LT 2.5 -01	ug/g	BZ1005
			Arsenic	8.21+00	ug/g	BZ2022
			Atrazine	LT 2.5 -01	ug/g	BZ1005
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1008
			Benzene	LT 3. -01	ug/g	BZ1008
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1008
			Cadmium	LT 7.36-01	ug/g	BZE014
			Methylene Chloride	2. +00	ug/g	BZ1008
			Chloroform	LT 3. -01	ug/g	BZ1008
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZ1005
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ1010
			Chlorobenzene	LT 3. -01	ug/g	BZ1008
			Chlordane	LT 1.7 +00	ug/g	BZ1005
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZ1005
			p-Chlorophenylmethyl Sulfonide	LT 2.5 -01	ug/g	BZ1005
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZ1005
			Chromium	1.35+01	ug/g	BZE014
			Copper	3.22+01	ug/g	BZE014
			Pibromochloropropane	LT 2.8 -01	ug/g	BZ1005
			Dibromochloropropane	LT 4. -01	ug/g	BZ1008
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZ1005
			Dicyclopentadiene	LT 3. -01	ug/g	BZ1008
			Vapona	LT 3.0 +00	ug/g	BZ1005
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZ1005
			Dithiane	LT 3.6 -01	ug/g	BZ1005
			Dieldrin	1.5 +00	ug/g	BZ1005
			Dimethyldisulfide	LT 8. -01	ug/g	BZ1008

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0106	4-5	Soil	Endrin	LT 4.6 -01	ug/g	BZH005
			Ethylbenzene	LT 3. -01	ug/g	BZ1008
			Mercury	LT 1.23-01	ug/g	BZF014
			Isodrin	LT 2.9 -01	ug/g	BZH005
			Toluene	LT 3. -01	ug/g	BZ1008
			Methylisobutyl Ketone	LT 3. -01	ug/g	BZ1008
			Malathion	LT 7.1 -01	ug/g	BZH005
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZH005
			Lead	LT 8.38+00	ug/g	BZE014
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZH005
			Dichlorodiphenyltrichloro-ethane	LT 4.7 -01	ug/g	BZH005
			Parathion	LT 8.5 -01	ug/g	BZH005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZH005
			Tetrachloroethene	3. +00	ug/g	BZ1008
1001CS0107	4-5	Soil	Thiodiglycol	LT 4.20+00	ug/g	BZJ010
			Trichloroethene	LT 3. -01	ug/g	BZ1008
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZ1008
			Zinc	1.13+02	ug/g	BZE014
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BZ1009
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BZ1009
			1,1-Dichloroethane	LT 9. -01	ug/g	BZ1009
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1009
			1,2-Dichloroethane	LT 3. -01	ug/g	BZ1009
			m-Xylene	LT 7. -01	ug/g	BZ1009
			Aldrin	LT 2.5 -01	ug/g	BZH006
			Arsenic	1.52+01	ug/g	BY2023
			Atrazine	LT 2.5 -01	ug/g	BZH006
			Bicycloheptadiene	LT 3. -01	ug/g	BZ1009
			Benzene	LT 3. -01	ug/g	BZ1009
			Carbon Tetrachloride	LT 3. -01	ug/g	BZ1009
			Cadmium	LT 7.36-01	ug/g	BZE015
			Methylene Chloride	2. +00	ug/g	BZ1009

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0107	4.5	Soil	Chloroform	LT 3. -01	ug/g	821009
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	82H006
			Chloroacetic Acid	LT 3.55+01	ug/g	82J011
			Chlorobenzene	LT 3. -01	ug/g	821009
			Chlordane	LT 1.7 +00	ug/g	82H006
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	82H006
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	82H006
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	82H006
			Chromium	1.11+01	ug/g	82E015
			Copper	5.14+01	ug/g	82E015
			Dibromochloropropane	LT 2.8 -01	ug/g	82H006
			Dibromochloropropane	LT 4. -01	ug/g	821009
			Dicyclopentadiene	LT 1.1 +00	ug/g	82H006
			Dicyclopentadiene	LT 3. -01	ug/g	821009
			Vapone	LT 3.0 +00	ug/g	82H006
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	82H006
			Dithiane	LT 3.6 -01	ug/g	82H006
			Dieldrin	1.2 +00	ug/g	82H006
			Dimethyldisulfide	LT 8. -01	ug/g	821009
			Endrin	LT 4.6 -01	ug/g	82H006
			Ethylbenzene	LT 3. -01	ug/g	821009
			Mercury	2.60-01	ug/g	82F015
			Isodrin	LT 2.9 -01	ug/g	82H006
			Toluene	LT 3. -01	ug/g	821009
			Methylisobutyl Ketone	LT 3. -01	ug/g	821009
			Malathion	LT 7.1 -01	ug/g	82H006
			1,4-Oxethiane	LT 2.5 -01	ug/g	82H006
			Lead	LT 8.38+00	ug/g	82E015
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	82H006
			Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	82H006
			Parathion	LT 8.5 -01	ug/g	82H006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	82H006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0107	4-5	Soil	Tetrachloroethene	6. +00	ug/g	BZ1009
			Trichloroglycol	LT 4.20+00	ug/g	BZJ011
			Trichloroethene	LT 3. -01	ug/g	BZ1009
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BZ1009
			Zinc	2.58+02	ug/g	BZE015
1001CS0108	4-5	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM002
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM002
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM002
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM002
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM002
			m-Xylene	LT 7.4 -01	ug/g	BZM002
			Aldrin	LT 2.5 -01	ug/g	BZM006
			Arsenic	LT 2.4 +01	ug/g	BZM006
			Atrazine	LT 2.5 -01	ug/g	BZM008
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZM002
			Benzene	LT 2.5 -01	ug/g	BZM002
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM002
			Cadmium	LT 7.36-01	ug/g	BZE017
			Methylene Chloride	LT 1.5 +00	ug/g	BZM002
			Chloroform	LT 2.9 -01	ug/g	BZM002
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZM008
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ0005
			Chlorobenzene	LT 1.5 +00	ug/g	BZM002
			Chlordane	LT 1.7 +00	ug/g	BZM008
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZM008
			p-Chlorophenylmethyl Sulfonide	LT 2.5 -01	ug/g	BZM008
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZM008
			Chromium	1.37+01	ug/g	BZE017
			Copper	3.67+01	ug/g	BZE017
			Dibromochloropropane	LT 2.8 -01	ug/g	BZM008
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM002
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZM008
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM002

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0108	4-5	Soil	Vapona	LT 3.0 +00	ug/g	BZM008
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZM006
			Dithiane	LT 3.6 -01	ug/g	BZM008
			Dieldrin	LT 2.5 -01	ug/g	BZM008
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM002
			Endrin	LT 4.6 -01	ug/g	BZM008
			Ethylbenzene	LT 3.8 -01	ug/g	BZM002
			Mercury	LT 5.00 -02	ug/g	BZF017
			Isodrin	LT 2.9 -01	ug/g	BZM008
			Toluene	LT 2.5 -01	ug/g	BZM002
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM002
			Malethion	LT 7.1 -01	ug/g	BZM008
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZM008
			Lead	LT 1.57 +01	ug/g	BZE017
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZM008
			Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZM008
			Parathion	LT 8.5 -01	ug/g	BZM008
1001CS0108	8-9	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZM008
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM002
			Thiodiglycol	LT 4.20 +00	ug/g	BZ0005
			Trichloroethene	LT 5.4 -01	ug/g	BZM002
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM002
			Zinc	1.09 +02	ug/g	BZE017
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM003
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM003
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM003
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM003
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM003
			m-Xylene	LT 7.4 -01	ug/g	BZM003
			Aldrin	LT 2.5 -01	ug/g	BZM009
			Arsenic	LT 5.0 +00	ug/g	BZM007
			Atrazine	LT 2.5 -01	ug/g	BZM009

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C50108	8-9	Soil	Bicycloheptadiene	LT 3.6 -01	ug/g	B2M003
			Benzene	LT 2.5 -01	ug/g	B2M003
			Carbon Tetrachloride	LT 2.5 -01	ug/g	B2M003
			Cadmium	LT 7.36-01	ug/g	B2E018
			Methylene Chloride	LT 1.5 +00	ug/g	B2M003
			Chloroform	LT 2.9 -01	ug/g	B2M003
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	B2M009
			Chloroacetic Acid	LT 3.55+01	ug/g	B20006
			Chlorobenzene	LT 1.5 +00	ug/g	B2M003
			Chlordane	LT 1.7 +00	ug/g	B2M009
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	B2M009
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	B2M009
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	B2M009
			Chromium	1.28+01	ug/g	B2E018
			Copper	3.38+01	ug/g	B2E018
			Dibromochloropropane	LT 2.8 -01	ug/g	B2M009
			Dibromochloropropane	LT 2.4 +00	ug/g	B2M003
			Dicyclopentadiene	LT 1.1 +00	ug/g	B2M009
			Dicyclopentadiene	LT 6.4 -01	ug/g	B2M003
			Vapona	LT 3.0 +00	ug/g	B2M009
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	B2M009
			Dithiane	LT 3.6 -01	ug/g	B2M009
			Dieldrin	LT 2.5 -01	ug/g	B2M009
			Dimethyldisulfide	LT 2.0 +01	ug/g	B2M003
			Endrin	LT 4.6 -01	ug/g	B2M009
			Ethylbenzene	LT 3.8 -01	ug/g	B2M003
			Mercury	LT 5.00-02	ug/g	B2F018
			Isodrin	LT 2.9 -01	ug/g	B2M009
			Toluene	LT 2.5 -01	ug/g	B2M003
			Methylisobutyl ketone	LT 7.3 -01	ug/g	B2M003
			Malathion	LT 7.1 -01	ug/g	B2M009
			1,4-Oxathiane	LT 2.5 -01	ug/g	B2M009
			Lead	LT 8.38+00	ug/g	B2E018
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	B2M009

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0108	8-9	Soil	Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZM009
			Parathion	LT 8.5 -01	ug/g	BZM009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZM009
			Tetrachloroethene	2.8 +00	ug/g	BZM003
			Thiodiethylcol	LT 4.20+00	ug/g	BZ0006
			Trichloroethene	LT 5.4 -01	ug/g	BZM003
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM003
			Zinc	1.10+02	ug/g	BZE018
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM004
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM004
1001CS0108	14-15	Soil	1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM004
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM004
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM004
			m-Xylene	LT 7.4 -01	ug/g	BZM004
			Aldrin	LT 3.0 -01	ug/g	BZL002
			Arsenic	LT 5.0 +00	ug/g	BZM008
			Atrazine	LT 3.0 -01	ug/g	BZL002
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZM004
			Benzene	LT 2.5 -01	ug/g	BZM004
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM004
			Cadmium	LT 7.36-01	ug/g	BZE019
			Methylene Chloride	LT 1.5 +00	ug/g	BZM004
			Chloroform	LT 2.9 -01	ug/g	BZM004
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL002
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ0007
			Chlorobenzene	LT 1.5 +00	ug/g	BZM004
			Chlordane	LT 2.0 +00	ug/g	BZL002
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL002
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL002
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL002
			Chromium	1.30+01	ug/g	BZE019
			Copper	3.40+01	ug/g	BZE019

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results
 Task 10
 Rocky Mountain Arsenal Program
 Chemical Sewers -- South Plants
 01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0108	14-15	Soil	Dibromochloropropane	LT 3.0 -01	ug/g	BZL002
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM004
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL002
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM004
			Vapone	LT 3.0 +00	ug/g	BZL002
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL002
			Dithiane	LT 4.0 -01	ug/g	BZL002
			Dieldrin	LT 3.0 -01	ug/g	BZL002
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM004
			Endrin	LT 5.0 -01	ug/g	BZL002
			Ethylbenzene	LT 3.8 -01	ug/g	BZM004
			Mercury	LT 5.00-02	ug/g	BZF019
			Isodrin	LT 3.0 -01	ug/g	BZL002
			Toluene	LT 2.5 -01	ug/g	BZM004
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM004
			Malathion	LT 7.0 -01	ug/g	BZL002
1001CS0109	4-5	Soil	1,4-Oxathiane	LT 3.0 -01	ug/g	BZL002
			Lead	LT 8.38+00	ug/g	BZE019
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL002
			Dichlorodiphenyltrichloro-ethane	LT 5.0 -01	ug/g	BZL002
			Parathion	LT 9.0 -01	ug/g	BZL002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL002
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM004
			Triiodoglycol	LT 4.20+00	ug/g	BZ0007
			Trichloroethene	LT 5.4 -01	ug/g	BZM004
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM004
			Zinc	1.11+02	ug/g	BZE019
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM005
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM005
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM005
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM005
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM005

Note: Results for some parameters may appear in more than one analytical fraction.

Flasco Services Incorporated Rocky Mountain Arsenal Program 01/27/88
 Summary of Analytical Results Task 10 (Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0109	4-5	Soil	m-Xylene	LT 7.4 -01	ug/g	BZM005
			Aldrin	LT 3.0 -01	ug/g	BZL003
			Arsenic	LT 5.0 +00	ug/g	BZM009
			Atrazine	LT 3.0 -01	ug/g	BZL003
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZM005
			Benzene	LT 2.5 -01	ug/g	BZM005
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM005
			Cadmium	LT 6.6 -01	ug/g	BZM005
			Methylene Chloride	LT 1.5 +00	ug/g	BZM005
			Chloroform	LT 2.9 -01	ug/g	BZM005
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL003
			Chloroacetic Acid	LT 3.55+01	ug/g	BZM008
			Chlorobenzene	LT 1.5 +00	ug/g	BZM005
			Chlordane	LT 2.0 +00	ug/g	BZL003
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL003
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL003
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL003
			Chromium	LT 5.2 +00	ug/g	BZM005
			Copper	2.9 +01	ug/g	BZM005
			Dibromochloropropane	LT 3.0 -01	ug/g	BZL003
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM005
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL003
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM005
			Vapona	LT 3.0 +00	ug/g	BZL003
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL003
			Dithiane	LT 4.0 -01	ug/g	BZL003
			Dieldrin	LT 3.0 -01	ug/g	BZL003
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM005
			Endrin	LT 5.0 -01	ug/g	BZL003
			Ethylbenzene	LT 3.8 -01	ug/g	BZM005
			Mercury	LT 5.00-02	ug/g	BZM005
			Isodrin	LT 3.0 -01	ug/g	BZL003
			Toluene	LT 2.5 -01	ug/g	BZM005
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM005

Note: Results for some parameters may appear in more than one analytical fraction.

Basco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Loc 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C50109	4-5	Soil	Malethion	LT 7.0 -01	ug/g	BZL003
			1,4-Oxathiane	LT 3.0 -01	ug/g	BZL003
			Lead	LT 1.3 +01	ug/g	BZ0005
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL003
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	BZL003
			Parathion	LT 9.0 -01	ug/g	BZL003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL003
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM005
			Thiodiethylcol	LT 4.20+00	ug/g	BZ0008
			Trichloroethene	LT 5.4 -01	ug/g	BZM005
1001C50109	8-9	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM005
			Zinc	8.6 +01	ug/g	BZ0005
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM006
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM006
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM006
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM006
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM006
			m-Xylene	LT 7.4 -01	ug/g	BZM006
			Aldrin	LT 3.0 -01	ug/g	BZL004
			Arsenic	LT 5.0 +00	ug/g	BZM010
			Atrazine	LT 3.0 -01	ug/g	BZL004
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZM006
			Benzene	LT 2.5 -01	ug/g	BZM006
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM006
			Cadmium	LT 6.6 -01	ug/g	BZ0006
			Methylene Chloride	LT 1.5 +00	ug/g	BZM006
			Chloroform	LT 2.9 -01	ug/g	BZM006
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL004
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ0009
			Chlorobenzene	LT 1.5 +00	ug/g	BZM006
			Chloroform	LT 2.0 +00	ug/g	BZL004
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL004

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0109	8-9	Soil	p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL004
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL004
			Chromium	LT 5.2 +00	ug/g	BZ0006
			Copper	LT 3.1 +01	ug/g	BZ0006
			Dibromochloropropane	LT 3.0 -01	ug/g	BZL004
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM006
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL004
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM006
			Vapors	LT 3.0 +00	ug/g	BZL004
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL004
			Dithiane	LT 4.0 -01	ug/g	BZL004
			Diethylin	LT 3.0 -01	ug/g	BZL004
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM006
			Endrin	LT 5.0 -01	ug/g	BZL004
			Ethylbenzene	LT 3.8 -01	ug/g	BZM006
			Mercury	LT 5.00-02	ug/g	BZP006
			Isodrin	LT 3.0 -01	ug/g	BZL004
			Toluene	LT 2.5 -01	ug/g	BZM006
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM006
			Malathion	LT 7.0 -01	ug/g	BZL004
			1,4-Oxathiane	LT 3.0 -01	ug/g	BZL004
			Lead	LT 1.3 +01	ug/g	BZ0006
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL004
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	BZL004
			Parathion	LT 9.0 -01	ug/g	BZL004
1001CS0109	13-14	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL004
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM006
			Thiodiglycol	LT 4.20+00	ug/g	BZ0009
			Trichloroethene	LT 5.4 -01	ug/g	BZM006
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM006
			Zinc	7.6 +01	ug/g	BZ0006
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM007

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0109	13-14	Soil	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM007
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM007
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM007
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM007
			m-Xylene	LT 7.4 -01	ug/g	BZM007
			Aldrin	LT 3.0 -01	ug/g	BZL005
			Arsenic	LT 5.0 +00	ug/g	BZM011
			Atrazine	LT 3.0 -01	ug/g	BZL005
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZM007
			Benzene	LT 2.5 -01	ug/g	BZM007
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM007
			Cadmium	LT 6.6 -01	ug/g	BZM007
			Methylene Chloride	LT 1.5 +00	ug/g	BZM007
			Chloroform	LT 2.9 -01	ug/g	BZM007
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL005
			Chloroacetic Acid	LT 3.55+01	ug/g	BZM010
			Chlorobenzene	LT 1.5 +00	ug/g	BZM007
			Chlordane	LT 2.0 +00	ug/g	BZL005
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL005
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL005
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL005
			Chromium	LT 5.2 +00	ug/g	BZM007
			Copper	LT 3.0 +01	ug/g	BZM007
			Dibromochloropropane	LT 3.0 -01	ug/g	BZL005
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM007
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL005
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM007
			Vapona	LT 3.0 +00	ug/g	BZL005
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL005
			Dithiane	LT 4.0 -01	ug/g	BZL005
			Dieldrin	LT 3.0 -01	ug/g	BZL005
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM007
			Endrin	LT 5.0 -01	ug/g	BZL005
			Ethylbenzene	LT 3.8 -01	ug/g	BZM007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results
 Task 10
 Rocky Mountain Arsenal Program
 Chemical Sewers -- South Plants
 01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C50109	13-14	Soil	Mercury	LT 5.00-02	ug/g	BZP007
			Isodrin	LT 3.0 -01	ug/g	BZL005
			Toluene	LT 2.5 -01	ug/g	BZM007
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM007
			Malathion	LT 7.0 -01	ug/g	BZL005
			1,4-Oxathiane	LT 3.0 -01	ug/g	BZL005
			Lead	LT 1.3 +01	ug/g	BZ0007
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL005
			Dichlorodiphenyltrichloro-ethane	LT 5.0 -01	ug/g	BZL005
			Parathion	LT 9.0 -01	ug/g	BZL005
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6.0 -01	ug/g	BZL005
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM007
			Thiodiglycol	LT 4.20+00	ug/g	BZ0010
			Trichloroethene	LT 5.4 -01	ug/g	BZM007
1001C50109	18-19	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM007
			Zinc	7.3 +01	ug/g	BZ0007
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM008
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM008
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM008
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZM008
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM008
			m-Xylene	LT 7.4 -01	ug/g	BZM008
			Aldrin	LT 3.0 -01	ug/g	BZL006
			Arsenic	LT 5.0 +00	ug/g	BZM012
			Atrazine	LT 3.0 -01	ug/g	BZL006
			Bicyclohexadiene	LT 3.6 -01	ug/g	BZM008
			Benzene	LT 2.5 -01	ug/g	BZM008
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM008
			Cadmium	LT 6.6 -01	ug/g	BZ0008
			Methylene Chloride	LT 1.5 +00	ug/g	BZM008
			Chloroform	LT 2.9 -01	ug/g	BZM008

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task In

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C30109	18-19	Soil	Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL006
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ0011
			Chlorobenzene	LT 1.5 +00	ug/g	BZM008
			Chlordane	LT 2.0 +00	ug/g	BZL006
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL006
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL006
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL006
			Chromium	8.9 +00	ug/g	BZ0008
			Copper	4.6 +01	ug/g	BZ0008
			Dibromochloropropane	LT 3.0 -01	ug/g	BZL006
			Dibromochloropropane	LT 2.4 +00	ug/g	BZM008
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL006
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZM008
			Vapona	LT 3.0 +00	ug/g	BZL006
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL006
			Dithiane	LT 4.0 -01	ug/g	BZL006
			Dieldrin	LT 3.0 -01	ug/g	BZL006
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZM008
			Endrin	LT 5.0 -01	ug/g	BZL006
			Ethylbenzene	LT 3.8 -01	ug/g	BZM008
			Mercury	LT 5.00-02	ug/g	BZP008
			Isodrin	LT 3.0 -01	ug/g	BZL006
			Toluene	LT 2.5 -01	ug/g	BZM008
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM008
			Malathion	LT 7.0 -01	ug/g	BZL006
			1,4-Oxathiane	LT 3.0 -01	ug/g	BZL006
			Lead	LT 1.3 +01	ug/g	BZ0008
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL006
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	BZL006
			Parathion	LT 9.0 -01	ug/g	BZL006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL006
			Tetrachloroethene	LT 2.5 -01	ug/g	BZM008

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Foring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0109	18-19	Soil	Thiodiglycol	LT 4.20+00	ug/g	BZ0011
			Trichloroethene	LT 5.4 -01	ug/g	BZM008
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM008
			Zinc	LT 9.9 +01	ug/g	BZ0008
1001CS0109	22-23	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZR002
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR002
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR002
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZR002
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR002
			m-Xylene	LT 7.4 -01	ug/g	BZR002
			Aldrin	LT 3.0 -01	ug/g	BZL007
			Arsenic	LT 5.0 +00	ug/g	BZM013
			Atrazine	LT 3.0 -01	ug/g	BZL007
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZR002
			Benzene	LT 2.5 -01	ug/g	BZR002
			Carbon Tetrachloride	LT 2.5 -01	ug/g	BZR002
			Cadmium	LT 6.6 -01	ug/g	BZ0009
			Methylene Chloride	LT 1.5 +00	ug/g	BZR002
			Chloroform	LT 2.9 -01	ug/g	BZR002
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	BZL007
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ0012
			Chlorobenzene	LT 1.5 +00	ug/g	BZR002
			Chlordane	LT 2.0 +00	ug/g	BZL007
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZL007
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL007
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL007
			Chromium	9.4 +00	ug/g	BZ0009
			Copper	3.0 +01	ug/g	BZ0009
			Dibromochloropropane	LT 3.0 -01	ug/g	BZL007
			Dibromochloropropane	LT 2.4 +00	ug/g	BZR002
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL007
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZR002
			Vapone	LT 3.0 +00	ug/g	BZL007
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
 Summary of Analytical Results
 Task 10
 Rocky Mountain Arsenal Program
 Chemical Severs -- South Plants
 01/27/86

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0109	22-23	Soil	Dithiane	LT 4.0 -01	ug/g	BZL007
			Dieldrin	LT 3.0 -01	ug/g	BZL007
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR002
			Endrin	LT 5.0 -01	ug/g	BZL007
			Ethylbenzene	LT 3.5 -01	ug/g	BZR002
			Mercury	LT 5.00-02	ug/g	BZP009
			Isodrin	LT 3.0 -01	ug/g	BZL007
			Toluene	LT 2.5 -01	ug/g	BZR002
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR002
			Malathion	LT 7.0 -01	ug/g	BZL007
			1,4-Oxathiane	LT 3.0 -01	ug/g	BZL007
			Lead	LT 1.3 +01	ug/g	BZ0009
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL007
			Dichlorodiphenyltrichloro-ethane	LT 5.0 -01	ug/g	BZL007
			Parathion	LT 9.0 -01	ug/g	BZL007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL007
			Tetrachloroethene	LT 2.5 -01	ug/g	BZR002
			Thiodiglycol	LT 4.20+00	ug/g	BZ0012
			Trichloroethene	LT 5.4 -01	ug/g	BZR002
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR002
1001CS0110	3	Soil	Zinc	7.3 +01	ug/g	BZ0009
			Aldrin	LT 2.5 -01	ug/g	BZH007
			Arsenic	1.3 +01	ug/g	BZM005
			Atrazine	LT 2.5 -01	ug/g	BZH007
			Cadmium	LT 7.36-01	ug/g	BZE016
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZH007
			Chloroacetic Acid	LT 3.55+01	ug/g	BZJ012
			Chlordane	LT 1.7 +00	ug/g	BZH007
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZH007
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	BZH007
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZH007

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C50110	3	Soil	Chromium	6.38+01	ug/g	BZE016
			Copper	3.49+01	ug/g	BZE016
			Dibromochloropropane	LT 2.8 -01	ug/g	BZH007
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZH007
			Vapona	LT 3.0 +00	ug/g	BZH007
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZH007
			Dithiane	LT 3.6 -01	ug/g	BZH007
			Dieldrin	LT 4.5 +00	ug/g	BZH007
			Endrin	LT 4.6 -01	ug/g	BZH007
			Mercury	2.27+00	ug/g	BZF016
			Isodrin	LT 2.5 -01	ug/g	BZH007
			Melathion	LT 7.1 -01	ug/g	BZH007
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZH007
			Lead	3.94+01	ug/g	BZE016
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZH007
1001C50111	4-5	Soil	Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZH007
			Parathion	LT 8.5 -01	ug/g	BZH007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZH007
			Thiodiglycol	LT 4.20+00	ug/g	BZJ012
			Zinc	8.22+02	ug/g	BZE016
			Aldrin	1.0 +00	ug/g	CAM002
			Atrazine	LT 3.0 -01	ug/g	CAM002
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAM002
			Chloroacetic Acid	LT 3.55+01	ug/g	CAK010
			Chlordane	LT 2.0 +00	ug/g	CAM002
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAM002
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAM002
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAM002
			Dibromochloropropane	LT 3.0 -01	ug/g	CAM002
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAM002
			Vapona	LT 3.0 -01	ug/g	CAM002

Note: Results for some parameters may appear in more than one analytical fraction.

U1/27/88

Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

Ebasco Services Incorporated

Summary of Analytical Results

Task 10

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0111	4-5	Soil	Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAM002
			Dithiane	LT 4.0 -01	ug/g	CAM002
			Endrin	LT 5.2 -01	ug/g	CAM002
			Isodrin	LT 5.0 -01	ug/g	CAM002
			Isodrin	LT 3.0 -01	ug/g	CAM002
			Malathion	LT 7.0 -01	ug/g	CAM002
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAM002
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAM002
			Dichlorodiphenyltrichloro- ethane	LT 5.0 -01	ug/g	CAM002
			Parathion	LT 9.0 -01	ug/g	CAM002
1001CS0201	7.8-8.8	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylethyl Phosphates	LT 6.0 -01	ug/g	CAM002
			Thiodiglycol	LT 4.20+00	ug/g	CAK010
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZRO05
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZRO05
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZRO05
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZRO05
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZRO05
			m-Xylene	3.0 +03	ug/g	BZRO05
			Aldrin	4.8 +02	ug/g	BZLO10
			Arsenic	8.0 +01	ug/g	BZNO16
			Atrazine	LT 3.0 -01	ug/g	BZLO10
			Bicycloheptadiene	2.0 +01	ug/g	BZRO05
			Benzene	LT 2.5 -01	ug/g	BZRO05
			Carbon Tetrachloride	9.0 +01	ug/g	BZRO05
			Cadmium	LT 6.6 -01	ug/g	BZ0012
			Methylene Chloride	LT 1.5 +00	ug/g	BZRO05
			Chloroform	4.3 +01	ug/g	BZRO05
			Hexachlorocyclopentadiene	5.4 +02	ug/g	BZLO10
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT007
			Chlorobenzene	2.1 +01	ug/g	BZRO05
			Chlordane	LT 2.0 +00	ug/g	BZLO10
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	BZLO10

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task IN

Chemical Sewers - South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0201	7.8-8.8	Soil	p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	BZL010
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	BZL010
			Chromium	8.5 +00	ug/g	BZ0012
			Copper	1.6 +01	ug/g	BZ0012
			Dibromochloropropane	4.4 +03	ug/g	BZL010
			Dibromochloropropane	7.1 +03	ug/g	BZ0005
			Dicyclopentadiene	LT 1.0 +00	ug/g	BZL010
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZ0005
			Vapona	LT 3.0 +00	ug/g	BZL010
			Bisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	BZL010
			Dithiane	LT 4.0 -01	ug/g	BZL010
			Dieldrin	5.4 +01	ug/g	BZL010
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZ0005
			Endrin	LT 5.0 -01	ug/g	BZL010
			Ethylbenzene	LT 3.8 -01	ug/g	BZ0005
			Mercury	5.10 -01	ug/g	BZ0012
			Isodrin	6.7 +01	ug/g	BZL010
			Toluene	1.5 +02	ug/g	BZ0005
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZ0005
			Malathion	LT 7.0 -01	ug/g	BZL010
1001CS0202	7.8-8.8	Soil	1,4-Oxathiane	LT 3.0 -01	ug/g	BZL010
			Lead	7.9 +01	ug/g	BZ0012
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL010
			Dichlorodiphenyltrichloro-ethane	LT 5.0 -01	ug/g	BZL010
			Parathion	LT 9.0 -01	ug/g	BZL010
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	BZL010
			Tetrachloroethene	2.1 +01	ug/g	BZ0005
			Thiodiglycol	LT 4.20+00	ug/g	BZ0007
			Trichloroethene	LT 5.4 -01	ug/g	BZ0005
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZ0005
			Zinc	2.6 +01	ug/g	BZ0012
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZ0006

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS1202	7.8-8.8	Soil	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR006
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR006
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZR006
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR006
			m-Xylene	2.7 +00	ug/g	BZR006
			Aldrin	2. +04	ug/g	BZS002
			Arsenic	3.1 +01	ug/g	BZN017
			Atrazine	2. +03	ug/g	BZS002
			Bicycloheptadiene	4.8 +01	ug/g	BZR006
			Benzene	LT 2.5 -01	ug/g	BZR006
			Carbon Tetrachloride	1.0 +02	ug/g	BZR006
			Cadmium	1.3 +00	ug/g	BZ0013
			Methylene Chloride	LT 1.5 +00	ug/g	BZR006
			Chloroform	2.7 +01	ug/g	BZR006
			Hexachlorocyclopentadiene	LT 2. +03	ug/g	BZS002
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT008
			Chlorobenzene	LT 1.5 +00	ug/g	BZR006
			Chlordane	LT 3. +03	ug/g	BZS002
			p-Chlorophenylmethyl Sulfide	LT 2. +04	ug/g	BZS002
			p-Chlorophenylmethyl Sulfoxide	LT 4. +04	ug/g	BZS002
			p-Chlorophenylmethyl Sulfone	LT 3. +03	ug/g	BZS002
			Chromium	1.3 +01	ug/g	BZ0013
			Copper	3.2 +01	ug/g	BZ0013
			Dibromochloropropane	5.1 +03	ug/g	BZR006
			Dibromochloropropane	6. +03	ug/g	BZS002
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZR006
			Dicyclopentadiene	LT 2. +03	ug/g	BZS002
			Vapona	LT 2. +03	ug/g	BZS002
			Disopropylmethyl Phosphonate	LT 2. +03	ug/g	BZS002
			Dithiane	LT 4. +04	ug/g	BZS002
			Dieldrin	LT 2. +03	ug/g	BZS002
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR006
			Endrin	LT 2. +03	ug/g	BZS002
			Ethylbenzene	LT 3.8 -01	ug/g	BZR006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0202	7.8-8.8	Soil	Mercury	4.45-01	ug/g	BZP013
			Isodrin	LT 2. +03	ug/g	BZS002
			Toluene	1.9 +02	ug/g	BZR006
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR006
			Malathion	LT 2. +03	ug/g	BZS002
			1,4-Oxathiane	LT 3. +04	ug/g	BZS002
			Lead	LT 1.3 +01	ug/g	BZ0013
			Dichlorodiphenylethane	LT 2. +03	ug/g	BZS002
			Dichlorodiphenyltrichloroethane	LT 3. +03	ug/g	BZS002
			Parathion	LT 2. +03	ug/g	BZS002
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 2. +03	ug/g	BZS002
			Tetrachloroethene	2.7 +01	ug/g	BZR006
			Thiodiglycol	LT 4.20+00	ug/g	BZT008
			Trichloroethene	LT 5.4 -01	ug/g	BZR006
1001CS0203	7.8-8.8	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR006
			Zinc	9.9 +01	ug/g	BZ0013
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZR003
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR003
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR003
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZR003
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR003
			m-Xylene	9.4 -01	ug/g	BZR003
			Aldrin	1.5 +02	ug/g	BZL008
			Arsenic	1.2 +01	ug/g	BZN014
			Atrazine	LT 2.5 -01	ug/g	BZL008
			Bicycloheptadiene	3.3 +01	ug/g	BZR003
			Benzene	LT 2.5 -01	ug/g	BZR003
			Carbon Tetrachloride	6.4 +01	ug/g	BZR003
1001CS0203	7.8-8.8	Soil	Cadmium	LT 6.6 -01	ug/g	BZ0010
			Methylene Chloride	LT 1.5 +00	ug/g	BZR003
			Chloroform	1.6 +01	ug/g	BZR003

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 1U

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0203	7.8-8.8	Soil	Hexachlorocyclopentadiene	4.8 +01	ug/g	BZL008
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT005
			Chlorobenzene	LT 1.5 +00	ug/g	BZR003
			Chlordane	LT 1.7 +00	ug/g	BZL008
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZL008
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	BZL008
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZL008
			Chromium	LT 5.2 +00	ug/g	BZ0010
			Copper	LT 1.6 +01	ug/g	BZ0010
			Dibromochloropropane	LT 2.8 -01	ug/g	BZL008
			Dibromochloropropane	4.6 +03	ug/g	BZR003
			Dicyclopentadiene	LT 1.1 +00	ug/g	BZL008
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZR003
			Vapona	LT 3.0 +00	ug/g	BZL008
			Bisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZL008
			Dithiane	LT 3.6 -01	ug/g	BZL008
			Dieldrin	5.6 +00	ug/g	BZL008
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR003
			Endrin	LT 4.6 -01	ug/g	BZL008
			Ethylbenzene	LT 3.8 -01	ug/g	BZR003
			Mercury	4.40-01	ug/g	BZP010
			Isodrin	2.4 +01	ug/g	BZL008
			Toluene	9.2 +01	ug/g	BZR003
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR003
			Malathion	LT 7.1 -01	ug/g	BZL008
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZL008
			Lead	5.9 +01	ug/g	BZ0010
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZL008
			Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	BZL008
			Parathion	LT 8.5 -01	ug/g	BZL008
			2-Chloro-1(2,4-Dichlorophenyl)	LT 6.1 -01	ug/g	BZL008
			Vinylidethyl Phosphates			
			Tetrachloroethene	1.4 +01	ug/g	BZR003

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0203	7.8-8.8	Soil	Thiodiglycol	LT 4.20+00	ug/g	BZT005
			Trichloroethene	LT 5.4 -01	ug/g	BZRO03
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZRO03
			Zinc	3.2 +01	ug/g	BZ0010
1001CS0204	7.8-8.8	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZRO04
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZRO04
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZRO04
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZRO04
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZRO04
			m-Xylene	2.1 +00	ug/g	BZRO04
			Aldrin	1.1 +03	ug/g	BZLO09
			Arsenic	1.2 +01	ug/g	BZNG15
			Atrazine	LT 2.5 -01	ug/g	BZLO09
			Bicycloheptadiene	8.8 +00	ug/g	BZRO04
			Benzene	LT 2.5 -01	ug/g	BZRO04
			Carbon Tetrachloride	1.6 +01	ug/g	BZRO04
			Cadmium	LT 6.6 -01	ug/g	BZ0011
			Methylene Chloride	LT 1.5 +00	ug/g	BZRO04
			Chloroform	2.6 +00	ug/g	BZRO04
			Hexachlorocyclopentadiene	1.2 +02	ug/g	BZLO09
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT006
			Chlorobenzene	2.0 +00	ug/g	BZRO04
			Chlordane	LT 1.7 +00	ug/g	BZLO09
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZLO09
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	BZLO09
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZLO09
			Chromium	8.3 +00	ug/g	BZ0011
			Copper	2.4 +01	ug/g	BZ0011
			Dibromochloropropane	LT 2.8 -01	ug/g	BZLO09
			Dibromochloropropane	.3 +03	ug/g	BZRO04
			Dicyclopentadiene	8.4 +00	ug/g	BZLO09
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZRO04
			Vapona	LT 3.0 +00	ug/g	BZLO09
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZLO09

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0204	7.8-8.8	Soil	Dithiane	LT 3.6 -01	ug/g	BZL009
			Dieldrin	LT 6.5 +01	ug/g	BZL009
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR004
			Endrin	LT 4.6 -01	ug/g	BZL009
			Ethylbenzene	LT 3.8 -01	ug/g	BZR004
			Mercury	1.89-01	ug/g	BZP011
			Isodrin	1.5 +02	ug/g	BZL009
			Toluene	5.2 +01	ug/g	BZR004
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR004
			Malathion	LT 7.1 -01	ug/g	BZL009
			1,4-Oxathiane	LT 2.5 -01	ug/g	BZL009
			Lead	LT 1.3 +01	ug/g	BZ0011
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZL009
			Dichlorodiphenyltrichloro-ethane	1.5 +00	ug/g	BZL009
			Parathion	LT 8.5 -01	ug/g	BZL009
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	2.3 +00	ug/g	BZL009
			Tetrachloroethene	1.1 +01	ug/g	BZR004
			Thiodiglycol	LT 4.20+00	ug/g	BZT006
			Trichloroethene	LT 5.4 -01	ug/g	BZR004
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR004
1001CS0205	7.8-8.8	Soil	Zinc	5.3 +01	ug/g	BZ0011
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZR007
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR007
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR007
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZR007
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR007
			m-Xylene	LT 7.4 -01	ug/g	BZR007
			Aldrin	5. +03	ug/g	BZS003
			Arsenic	LT 5.0 +00	ug/g	BZND018
			Atrazine	LT 1. +02	ug/g	BZS003
			Bicycloheptadiene	1.0 +01	ug/g	BZR007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task ID

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0205	7.8-8.8	Soil	Benzene	LT 2.5 -01	ug/g	BZR007
			Carbon Tetrachloride	3.6 +01	ug/g	BZR007
			Cadmium	LT 6.6 -01	ug/g	BZ0014
			Methylene Chloride	LT 1.5 +00	ug/g	BZR017
			Chloroform	2.3 +01	ug/g	BZR007
			Hexachlorocyclopentadiene	LT 1. +02	ug/g	BZS003
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT009
			Chlorobenzene	LT 1.5 +00	ug/g	BZR007
			Chlordane	LT 2. +02	ug/g	BZS003
			p-Chlorophenylmethyl Sulfide	LT 2. +03	ug/g	BZS003
			p-Chlorophenylmethyl Sulfoxide	LT 3. +03	ug/g	BZS003
			p-Chlorophenylmethyl Sulfone	LT 2. +02	ug/g	BZS003
			Chromium	LT 5.2 +00	ug/g	BZ0014
			Copper	LT 4.9 +00	ug/g	BZ0014
			Dibromochloropropane	4.2 +03	ug/g	BZR007
			Dibromochloropropane	1. +04	ug/g	BZS003
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZR007
			Dicyclopentadiene	LT 2. +02	ug/g	BZS003
			Vapona	LT 1. +02	ug/g	BZS003
			Diisopropylmethyl Phosphonate	LT 1. +02	ug/g	BZS003
			Dithiane	LT 3. +03	ug/g	BZS003
			Diethrin	LT 1. +02	ug/g	BZS003
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR007
			Endrin	LT 1. +02	ug/g	BZS003
			Ethylbenzene	LT 3.8 -01	ug/g	BZR007
			Mercury	4.83-01	ug/g	BZP014
			Isodrin	LT 1. +02	ug/g	BZS003
			Toluene	2.6 +01	ug/g	BZR007
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR007
			Malathion	LT 1. +02	ug/g	BZS003
			1,4-Oxathiane	LT 2. +03	ug/g	BZS003
			Lead	5.9 +01	ug/g	BZ0014
			Dichlorodiphenylethane	LT 1. +02	ug/g	BZS003
			Dichlorodiphenyltrichloroethane	LT 2. +02	ug/g	BZS003

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0205	7.8-8.8	Soil	Parathion	LT 2. +02	ug/g	BZS003
			2-Chloro-1(2,4-Dichlorophenyl)	LT 1. +02	ug/g	BZS003
			Vinylidethyl Phosphates			
			Tetrachloroethene	5.7 +00	ug/g	BZR007
			Trifluoroglycol	LT 4.20+00	ug/g	BZT009
			Trichloroethene	LT 5.4 -01	ug/g	BZR007
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR007
1001CS0206	7.8-8.8	Soil	Zinc	LT 9.5 +00	ug/g	BZ0014
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZR008
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR008
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR008
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZR008
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR008
			m-Xylene	LT 7.4 -01	ug/g	BZR008
			Aldrin	2. +04	ug/g	BZS004
			Arsenic	1.0 +01	ug/g	BZNO19
			Atrazine	LT 1. +02	ug/g	BZS004
			Bicycloheptadiene	9.2 -01	ug/g	BZR008
			Benzene	LT 2.5 -01	ug/g	BZR008
			Carbon Tetrachloride	5.1 +00	ug/g	BZR008
			Cadmium	LT 6.6 -01	ug/g	BZ0015
			Methylene Chloride	LT 1.5 +00	ug/g	BZR008
			Chloroform	2.7 +00	ug/g	BZR008
			Hexachlorocyclopentadiene	LT 1. +02	ug/g	BZS004
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT010
			Chlorobenzene	LT 1.5 +00	ug/g	BZR008
			Chlordane	LT 2. +02	ug/g	BZS004
			p-Chlorophenylmethyl Sulfide	LT 2. +03	ug/g	BZS004
			p-Chlorophenylmethyl Sulfonide	LT 3. +03	ug/g	BZS004
			p-Chlorophenylmethyl Sulfone	LT 2. +02	ug/g	BZS004
			Chromium	9.8 +00	ug/g	BZ0015
			Copper	3.4 +01	ug/g	BZ0015
			Dibromochloropropane	1.6 +02	ug/g	BZR008

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0206	7.8-8.8	Soil	Dibromochloropropane	4. +03	ug/g	BZS004
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZR008
			Dicyclopentadiene	LT 2. +02	ug/g	BZS004
			Vapona	LT 1. +02	ug/g	BZS004
			Diisopropylmethyl Phosphonate	LT 1. +02	ug/g	BZS004
			Dithiane	LT 3. +03	ug/g	BZS004
			Dieldrin	2. +02	ug/g	BZS004
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZR008
			Endrin	LT 1. +02	ug/g	BZS004
			Ethylbenzene	LT 3.8 -01	ug/g	BZR008
			Mercury	1.27+00	ug/g	BZP015
			Isodrin	4. +02	ug/g	BZS004
			Toluene	6.7 -01	ug/g	BZR008
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR008
			Malathion	LT 1. +02	ug/g	BZS004
			1,4-Oxathiane	LT 2. +03	ug/g	BZS004
			Lead	6.1 +01	ug/g	BZ0015
			Dichlorodiphenylethane	LT 1. +02	ug/g	BZS004
			Dichlorodiphenyltrichloroethane	5. +02	ug/g	BZS004
			Parathion	LT 2. +02	ug/g	BZS004
1001CS0207	7.8-8.8	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 1. +02	ug/g	BZS004
			Tetrachloroethene	1.6 +00	ug/g	BZR008
			Thiodiglycol	LT 4.20+00	ug/g	BZT010
			Trichloroethene	LT 5.4 -01	ug/g	BZR008
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR008
			Zinc	9.0 +01	ug/g	BZ0015
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZU002
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZU002
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZU002
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZU002
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZU002

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0707	7.8-8.8	Soil	m-Xylene	LT 7.4 -01	ug/g	BZU002
			Aldrin	2. +04	ug/g	BZS005
			Arsenic	1.1 +01	ug/g	BZU020
			Atrazine	LT 2. +02	ug/g	BZS005
			Bicycloheptadiene	5.5 +00	ug/g	BZU002
			Benzene	LT 2.5 -01	ug/g	BZU002
			Carbon Tetrachloride	9.8 +00	ug/g	BZU002
			Cadmium	LT 6.6 -01	ug/g	BX0016
			Methylene Chloride	LT 1.5 +00	ug/g	BZU002
			Chloroform	1.6 +00	ug/g	BZU002
			Hexachlorocyclopentadiene	LT 2. +02	ug/g	BZS005
			Chloroacetic Acid	LT 3.55+01	ug/g	BZU011
			Chlorobenzene	LT 1.5 +00	ug/g	BZU002
			Chlordane	LT 5. +02	ug/g	BZS005
			p-Chlorophenylmethyl Sulfide	LT 3. +03	ug/g	BZS005
			p-Chlorophenylmethyl Sulfoxide	LT 6. +03	ug/g	BZS005
			p-Chlorophenylmethyl Sulfone	LT 5. +02	ug/g	BZS005
			Chromium	9.0 +00	ug/g	BX0016
			Copper	2.5 +01	ug/g	BX0016
			Dibromochloropropane	LT 2. +02	ug/g	BZS005
			Dibromochloropropane	6.3 +01	ug/g	BZU002
			Dicyclopentadiene	LT 3. +02	ug/g	BZS005
			Dicyclopentadiene	1.9 +00	ug/g	BZU002
			Varona	LT 2. +02	ug/g	BZS005
			Diisopropylmethyl Phosphonate	LT 2. +02	ug/g	BZS005
			Dithiane	LT 6. +03	ug/g	BZS005
			Dieldrin	LT 2. +02	ug/g	BZS005
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZU002
			Endrin	LT 2. +02	ug/g	BZS005
			Ethylbenzene	LT 3.8 -01	ug/g	BZU002
			Mercury	6.36-01	ug/g	BZP016
			Isodrin	4. +02	ug/g	BZS005
			Toluene	3.6 -01	ug/g	BZU002
			Methylisobutyl ketone	LT 7.3 -01	ug/g	BZU002

Note: Results for some parameters may appear in more than one analytical fraction.

Phasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth, (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0207	7.8-8.8	Soil	Malathion	LT 2. +02	ug/g	BZS005
			1,4-Oxathiane	LT 5. +03	ug/g	BZS005
			Lead	LT 1.3 +01	ug/g	BX0016
			Dichlorodiphenylethane	LT 2. +02	ug/g	BZS005
			Dichlorodiphenyltrichloro-ethane	LT 5. +02	ug/g	BZS005
			Parathion	LT 3. +02	ug/g	BZS005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 2. +02	ug/g	BZS005
			Tetrachloroethene	4.0 +00	ug/g	BZU002
			Thiodiethylcol	LT 4.20+00	ug/g	BZT011
			Trichloroethene	LT 5.4 -01	ug/g	BZU002
1001CS0207	11.8-12.8	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZU002
			Zinc	7.7 +01	ug/g	BX0016
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZU003
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZU003
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZU003
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZU003
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZU003
			m-Xylene	9.7 +00	ug/g	BZU003
			Aldrin	4. +04	ug/g	BZS006
			Arsenic	LT 5.0 +00	ug/g	BZM021
			Atrazine	LT 5. +02	ug/g	BZS006
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZU003
			Benzenes	4.5 +00	ug/g	BZU003
			Carbon Tetrachloride	2.0 +02	ug/g	BZU003
			Cadmium	LT 6.6 -01	ug/g	BZ0017
			Methylene Chloride	LT 1.5 +00	ug/g	BZU003
			Chloroform	3.6 +01	ug/g	BZU003
			Hexachlorocyclopentadiene	LT 5. +02	ug/g	BZS006
			Chloroacetic Acid	LT 3.55+01	ug/g	BZT012
			Chlorobenzene	3.6 +00	ug/g	BZU003
			Chlordane	LT 1. +02	ug/g	BZS006
			p-Chlorophenylmethyl Sulfide	LT 6. +03	ug/g	BZS006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001C50207	11.8-12.8	Soil	p-Chlorophenylmethyl Sulfonide	LT 1. +04	ug/g	82S006
			p-Chlorophenylmethyl Sulfone	LT 1. +02	ug/g	82S006
			Chromium	LT 5.2 +00	ug/g	820017
			Copper	2.6 +01	ug/g	820017
			Dibromochloropropane	2. +04	ug/g	82S006
			Dibromochloropropane	2.2 +03	ug/g	82U003
			Dicyclopentadiene	LT 6. +02	ug/g	82S006
			Dicyclopentadiene	LT 6.4 -01	ug/g	82U003
			Vapona	LT 5. +02	ug/g	82S006
			Diisopropylmethyl Phosphonate	LT 5. +02	ug/g	82S006
			Dithiane	LT 1. +04	ug/g	82S006
			Dieldrin	LT 5. +02	ug/g	82S006
			Dimethyldisulfide	LT 2.0 +01	ug/g	82U003
			Endrin	LT 5. +02	ug/g	82S006
			Ethylbenzene	2.5 +00	ug/g	82U003
			Mercury	2.93-01	ug/g	82P017
			Isodrin	1. +03	ug/g	82S006
			Toluene	6.2 +01	ug/g	82U003
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	82U003
			Malathion	LT 5. +02	ug/g	82S006
			1,4-Oxathiane	LT 1. +03	ug/g	82S006
			Lead	LT 1.3 +01	ug/g	820017
			Dichlorodiphenylethane	LT 5. +02	ug/g	82S006
			Dichlorodiphenyltrichloroethane	LT 1. +02	ug/g	82S006
			Parathion	LT 6. +02	ug/g	82S006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidylethyl Phosphates	LT 5. +02	ug/g	82S006
			Tetrachloroethene	8.6 +01	ug/g	82U003
			Triiodoglycol	LT 4.20+00	ug/g	82T012
			Trichloroethene	LT 5.4 -01	ug/g	82U003
			Ortho- & Para-Xylene	8.9 +00	ug/g	82U003
			Zinc	7.4 +01	ug/g	820017
1001C50208	7.9-8.8	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	82U004

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0208	7.8-8.8	Soil	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZU004
			1,1-Dichloroethane	LT 1.7 +00	ug/g	BZU004
			1,2-Dichloroethane	LT 1.7 +00	ug/g	BZU004
			1,2-Dichloroethane	LT 5.6 -01	ug/g	BZU004
			m-Xylene	LT 7.4 -01	ug/g	BZU004
			Aldrin	3. +00	ug/g	BZS007
			Arsenic	LT 5.0 +00	ug/g	BZNO22
			Atrazine	LT 3. -01	ug/g	BZS007
			Bicycloheptadiene	LT 3.6 -01	ug/g	BZU004
			Benzene	LT 2.5 -01	ug/g	BZU004
			Carbon tetrachloride	LT 2.5 -01	ug/g	BZU004
			Cadmium	LT 6.6 -01	ug/g	BZ0018
			Methylene Chloride	LT 1.5 +00	ug/g	BZU004
			Chloroform	LT 2.9 -01	ug/g	BZU004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BZS007
			Chloroacetic Acid	LT 3.55+01	ug/g	BZV005
			Chlorobenzene	LT 1.5 +00	ug/g	BZU004
			Chlordane	LT 6. -01	ug/g	BZS007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BZS007
			p-Chlorophenylmethyl Sulfide	LT 7. +00	ug/g	BZS007
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BZS007
			Chromium	LT 5.2 +00	ug/g	BZ0018
			Copper	2.5 +01	ug/g	BZS007
			Dibromochloropropane	4. -01	ug/g	BZS007
			Dibromochloropropane	LT 2.4 +00	ug/g	BZU004
			Dicyclopentadiene	LT 4. -01	ug/g	BZS007
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZU004
			Vepona	LT 3. -01	ug/g	BZS007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BZS007
			Dithiane	LT 7. +00	ug/g	BZS007
			Dieldrin	LT 3. -01	ug/g	BZS007
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZU004
			Endrin	LT 3. -01	ug/g	BZS007
			Ethylbenzene	LT 3.8 -01	ug/g	BZU004

Note: Results for some parameters may appear in more than one analytical fraction.

Elanco Services Incorporated

Summary of Analytical Results

Task 10 Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0208	7.8-8.8	Soil	Mercury	LT 5.00-02	ug/g	B2P018
			Isodrin	LT 3. -01	ug/g	B2S007
			Toluene	LT 2.5 -01	ug/g	B2U004
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	B2U004
			Malathion	LT 3. -01	ug/g	B2S007
			1,4-Oxathiane	LT 6. +00	ug/g	B2S007
			Lead	LT 1.3 +01	ug/g	B20018
			Dichlorodiphenylethane	LT 3. -01	ug/g	B2S007
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	B2S007
			Parathion	LT 4. -01	ug/g	B2S007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	B2S007
			Tetrachloroethene	LT 2.5 -01	ug/g	B2U004
			Thiodiglycol	LT 4.20+00	ug/g	B2V005
			Trichloroethene	LT 5.4 -01	ug/g	B2U004
1001CS0208	11.8-12.8	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	B2U004
			Zinc	6.7 +01	ug/g	B20018
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	B2U005
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	B2U005
			1,1-Dichloroethane	LT 1.7 +00	ug/g	B2U005
			1,2-Dichloroethane	LT 1.7 +00	ug/g	B2U005
			1,2-Dichloroethane	LT 5.6 -01	ug/g	B2U005
			m-Xylene	1.2 +00	ug/g	B2U005
			Aldrin	1. +03	ug/g	B2S008
			Arsenic	LT 5.0 +00	ug/g	B2N023
			Atrazine	LT 1. +01	ug/g	B2S008
			Bicycloheptadiene	7.2 +01	ug/g	B2U005
			Benzene	1.9 +00	ug/g	B2U005
			Carbon Tetrachloride	1.6 +02	ug/g	B2U005
1001CS0208	11.8-12.8	Soil	Cadmium	LT 6.6 -01	ug/g	B20019
			Methylene Chloride	LT 1.5 +00	ug/g	B2U005
			Chloroform	4.6 +01	ug/g	B2U005

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0208	11.8-12.8	Soil	Hexachlorocyclopentadiene	LT 1. +01	ug/g	BZS008
			Chloroacetic Acid	LT 3.55+01	ug/g	BZV006
			Chlorobenzene	LT 4.3 +00	ug/g	BZU005
			Chlordane	LT 2. +01	ug/g	BZS008
			p-Chlorophenylmethyl Sulfide	LT 2. +02	ug/g	BZS008
			p-Chlorophenylmethyl Sulfoxide	LT 3. +02	ug/g	BZS008
			p-Chlorophenylmethyl Sulfone	LT 2. +01	ug/g	BZS008
			Chromium	7.8 +00	ug/g	BZ0019
			Copper	1.7 +01	ug/g	BZ0019
			Dibromochloropropane	2. +02	ug/g	BZS008
			Dibromochloropropane	1.2 +03	ug/g	BZU005
			Dicyclopentadiene	LT 2. +01	ug/g	BZS008
			Dicyclopentadiene	LT 6.4 -01	ug/g	BZU005
			Vapona	LT 1. +01	ug/g	BZS008
			Diisopropylmethyl Phosphonate	LT 1. +01	ug/g	BZS008
			Dithiane	LT 3. +02	ug/g	BZS008
			Dieldrin	LT 1. +01	ug/g	BZS008
			Dimethyldisulfide	LT 2.0 +01	ug/g	BZU005
			Endrin	LT 1. +01	ug/g	BZS008
			Ethylbenzene	LT 3.8 -01	ug/g	BZU005
			Mercury	5.69-02	ug/g	BZP019
			Isodrin	4. +01	ug/g	BZS008
			Toluene	3.0 +02	ug/g	BZU005
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZU005
			Malathion	LT 1. +01	ug/g	BZS008
			1,4-Oxathiane	LT 2. +02	ug/g	BZS008
			Lead	LT 1.3 +01	ug/g	BZ0019
			Dichlorodiphenylethane	LT 1. +01	ug/g	BZS008
			Dichlorodiphenyltrichloroethane	LT 2. +01	ug/g	BZS008
			Parathion	LT 2. +01	ug/g	BZS008
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 1. +01	ug/g	BZS008
			Tetrachloroethene	1.1 +01	ug/g	BZU005

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001CS0208	11.8-12.8	Soil	Thiodiglycol	LT 4.20+00	ug/g	BZV006
			Trichloroethene	LT 5.4 -01	ug/g	BZU005
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZU005
			Zinc	LT 5.4 +01	ug/g	BZ0019
1002CS0301	11.5-12.5	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAE008
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAE008
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAE008
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAE008
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAE008
			m-Xylene	LT 7.4 -01	ug/g	CAE008
			Aldrin	LT 2. +01	ug/g	CAC008
			Arsenic	LT 2.50+00	ug/g	BZ2019
			Atrazine	LT 2. +01	ug/g	CAC008
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAE008
			Benzene	LT 2.5 -01	ug/g	CAE008
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAE008
			Cadmium	LT 7.36-01	ug/g	CAA019
			Methylene Chloride	LT 1.5 +00	ug/g	CAE008
			Chloroform	LT 2.9 -01	ug/g	CAE008
			Hexachlorocyclopentadiene	3. +03	ug/g	CAC008
			Chlorobenzene	LT 1.5 +00	ug/g	CAE008
			Chlordane	LT 3. +01	ug/g	CAC008
			p-Chlorophenylmethyl Sulfide	LT 2. +02	ug/g	CAC008
			p-Chlorophenylmethyl Sulfoxide	LT 4. +02	ug/g	CAC008
			p-Chlorophenylmethyl Sulfone	LT 3. +01	ug/g	CAC008
			Chromium	1.11+01	ug/g	CAA019
			Copper	1.49+01	ug/g	CAA019
			Dibromochloropropane	LT 2. +01	ug/g	CAC008
			Dibromochloropropane	LT 2.4 +00	ug/g	CAE008
			Dicyclopentadiene	LT 2. +01	ug/g	CAC008
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAE008
			Varona	LT 2. +01	ug/g	CAC008
			Diisopropylmethyl Phosphonate	LT 2. +01	ug/g	CAC008
			Dithiane	LT 4. +02	ug/g	CAC008

Note: Results for some parameters may appear in more than one analytical fraction.

Fbasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0301	11.5-12.5	Soil	Dieldrin	LT 2. +01	ug/g	CAC008
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAE008
			Endrin	LT 2. +01	ug/g	CAC008
			Ethylbenzene	LT 3.8 -01	ug/g	CAE008
			Mercury	LT 6.56-02	ug/g	BZX019
			Isodrin	LT 2. +01	ug/g	CAC008
			Toluene	LT 2.5 -01	ug/g	CAE008
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAE008
			Malathion	LT 2. +01	ug/g	CAC008
			1,4-Oxathiane	LT 3. +02	ug/g	CAC008
			Lead	LT 6.41+02	ug/g	CAA019
			Dichlorodiphenylethane	LT 2. +01	ug/g	CAC008
			Dichlorodiphenyltrichloro-ethane	LT 3. +01	ug/g	CAC008
			Parathion	LT 2. +01	ug/g	CAC008
1002CS0302	11.5-12.5	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 2. +01	ug/g	CAC008
			Tetrachloroethene	LT 3.3 +00	ug/g	CAE008
			Trichloroethene	LT 5.4 -01	ug/g	CAE008
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAE008
			Zinc	LT 6.20+01	ug/g	CAA019
			1,1,1-Trichloroethane	LT 3. -01	ug/g	CAF002
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAF002
			1,1-Dichloroethane	LT 9. -01	ug/g	CAF002
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF002
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF002
			m-Xylene	LT 7. -01	ug/g	CAF002
			Aldrin	LT 3. +01	ug/g	CAC009
			Arsenic	LT 2.50+00	ug/g	BZX020
			Atrazine	LT 3. +01	ug/g	CAC009
			Bicycloheptadiene	LT 3. -01	ug/g	CAF002
			Benzene	LT 3. -01	ug/g	CAF002
			Carbon Tetrachloride	LT 9. +00	ug/g	CAF002
			Cadmium	LT 7.36-01	ug/g	CAA020

Note: Results for some parameters may appear in more than one analytical fraction.

Elbasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0302	11.5-12.5	Soil	Methylene Chloride	LT 7. -01	ug/g	CAF002
			Chloroform	LT 3. -01	ug/g	CAF002
			Hexachlorocyclopentadiene	LT 4. +03	ug/g	CAC009
			Chlorobenzene	LT 3. -01	ug/g	CAF002
			Chlordane	LT 6. +01	ug/g	CAC009
			p-Chlorophenylmethyl Sulfide	LT 4. +02	ug/g	CAC009
			p-Chlorophenylmethyl Sulfoxide	LT 7. +02	ug/g	CAC009
			p-Chlorophenylmethyl Sulfone	LT 6. +01	ug/g	CAC009
			Chromium	1.87+01	ug/g	CAA020
			Copper	1.92+01	ug/g	CAA020
			Dibromochloropropane	LT 3. +01	ug/g	CAC009
			Dibromochloropropane	LT 4. -01	ug/g	CAF002
			Dicyclopentadiene	LT 4. +01	ug/g	CAC009
			Dicyclopentadiene	LT 3. -01	ug/g	CAF002
			Vapors	LT 3. +01	ug/g	CAC009
			Diisopropylmethyl Phosphonate	LT 3. +01	ug/g	CAC009
			Dithiane	LT 7. +02	ug/g	CAC009
			Dieldrin	LT 3. +01	ug/g	CAC009
			Dimethyldisulfide	LT 8. -01	ug/g	CAF002
			Dieldrin	LT 3. +01	ug/g	CAC009
			Ethylbenzene	LT 3. -01	ug/g	CAF002
			Mercury	9.32-02	ug/g	BZX020
			Isodrin	LT 3. +01	ug/g	CAC009
			Toluene	LT 3. -01	ug/g	CAF002
			Methylisobutyl K-tone	LT 3. -01	ug/g	CAF002
			Malathion	LT 3. +01	ug/g	CAC009
			1,4-Oxathiane	LT 6. +02	ug/g	CAC009
			Lead	1.45+02	ug/g	CAA020
			Dichlorodiphenylethane	LT 3. +01	ug/g	CAC009
			Dichlorodiphenyltrichloroethane	LT 6. +01	ug/g	CAC009
			Parathion	LT 4. +01	ug/g	CAC009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. +01	ug/g	CAC009

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C50302	11.5-12.5	Soil	Tetrachloroethene	3. +00	ug/g	CAF002
			Trichloroethene	LT 3. -01	ug/g	CAF002
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF002
			Zinc	7.24+01	ug/g	CAA020
1002C50303	11.5-12.5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	CAF003
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAF003
			1,1-Dichloroethane	LT 9. -01	ug/g	CAF003
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF003
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF003
			m-Xylene	LT 7. -01	ug/g	CAF003
			Aldrin	LT 6. +00	ug/g	CAC010
			Arsenic	LT 2.50+00	ug/g	BZ2021
			Atrazine	LT 6. +00	ug/g	CAC010
			Bicycloheptadiene	LT 3. -01	ug/g	CAF003
			Benzene	LT 3. -01	ug/g	CAF003
			Carbon Tetrachloride	LT 3. -01	ug/g	CAF003
			Cadmium	LT 7.36-01	ug/g	CAG005
			Methylene Chloride	LT 7. -01	ug/g	CAF003
			Chloroform	LT 3. -01	ug/g	CAF003
			Hexachlorocyclopentadiene	3. +02	ug/g	CAC010
			Chlorobenzene	LT 3. -01	ug/g	CAF003
			Chloroethane	LT 1. +01	ug/g	CAC010
			p-Chlorophenylmethyl Sulfide	LT 8. +01	ug/g	CAC010
			p-(Chlorophenylmethyl Sulfide	LT 1. +02	ug/g	CAC010
			p-Chlorophenylmethyl Sulfone	LT 1. +01	ug/g	CAC010
			Chromium	1.64+01	ug/g	CAG005
			Copper	2.13+01	ug/g	CAG005
			Dibromochloropropane	LT 6. +00	ug/g	CAC010
			Dibromochloropropane	LT 4. -01	ug/g	CAF003
			Dicyclopentadiene	LT 8. +00	ug/g	CAC010
			Dicyclopentadiene	LT 3. -01	ug/g	CAF003
			Vapone	LT 6. +00	ug/g	CAC010
			Diisopropylmethyl Phosphonate	LT 6. +00	ug/g	CAC010
			Dithiane	LT 1. +02	ug/g	CAC010

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Last 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0303	11.5-12.5	Soil	Dieldrin	LT 6. +00	ug/g	CAC010
			Dimethyldisulfide	LT 8. -01	ug/g	CAF003
			Endrin	LT 6. +00	ug/g	CAC010
			Ethylbenzene	LT 3. -01	ug/g	CAF003
			Mercury	LT 5.00-02	ug/g	CAI005
			Isodrin	LT 6. +00	ug/g	CAC010
			Toluene	LT 3. -01	ug/g	CAF003
			Methylisobutyl Ketone	LT 3. -01	ug/g	CAF003
			Malathion	LT 6. +00	ug/g	CAC010
			1,4-Oxathiane	LT 1. +02	ug/g	CAC010
			Lead	2.16+01	ug/g	CAG005
			Dichlorodiphenylethane	LT 6. +00	ug/g	CAC010
			Dichlorodiphenyltrichloroethane	LT 1. +01	ug/g	CAC010
			Parathion	LT 8. +00	ug/g	CAC010
1002CS0304	11.5-12.5	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. +00	ug/g	CAC010
			Tetrachloroethene	LT 3. -01	ug/g	CAF003
			Trichloroethene	LT 3. -01	ug/g	CAF003
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF003
			Zinc	7.26+01	ug/g	CAG005
			1,1,1-Trichloroethane	LT 3. -01	ug/g	CAF004
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAF004
			1,1-Dichloroethane	LT 9. -01	ug/g	CAF004
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF004
			1,2-Dichloroethane	4. +01	ug/g	CAF004
			m-Xylene	LT 7. -01	ug/g	CAF004
			Aldrin	LT 3.0 -01	ug/g	CAD002
			Arsenic	3.31+00	ug/g	BZ002
			Atrazine	LT 3.0 -01	ug/g	CAD002
			Bicycloheptadiene	LT 3. -01	ug/g	CAF004
			Benzene	LT 3. -01	ug/g	CAF004
			Carbon Tetrachloride	3. +00	ug/g	CAF004
			Cadmium	LT 7.36-01	ug/g	CAG006

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Roring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C0304	11.5-12.5	Soil	Methylene Chloride	LT 7. -01	ug/g	CAF004
			Chloroform	2. +00	ug/g	CAF004
			Hexachlorocyclopentadiene	1.9 +03	ug/g	CAD002
			Chlorobenzene	LT 3. -01	ug/g	CAF004
			Chlordane	LT 2.0 +00	ug/g	CAD002
			p-Chlorophenylmethyl Sulfide	LT 3.0 -01	ug/g	CAD002
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD002
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD002
			Chromium	1.52+01	ug/g	CAG006
			Copper	2.61+01	ug/g	CAG006
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD002
			Dibromochloropropane	LT 4. -01	ug/g	CAF004
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD002
			Dicyclopentadiene	LT 3. -01	ug/g	CAF004
			Vapona	LT 3.0 +00	ug/g	CAD002
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD002
			Dithiane	LT 4.0 -01	ug/g	CAD002
			Dieldrin	1.2 +00	ug/g	CAD002
			Dimethyldisulfide	LT 8. -01	ug/g	CAF004
			Endrin	LT 5.0 -01	ug/g	CAD002
			Ethylbenzene	LT 3. -01	ug/g	CAF004
			Mercury	8.73-02	ug/g	CAI006
			Isodrin	LT 3.0 -01	ug/g	CAD002
			Toluene	LT 3. -01	ug/g	CAF004
			Methylisobutyl Ketone	LT 3. -01	ug/g	CAF004
			Malathion	LT 7.0 -01	ug/g	CAD002
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD002
			Lead	2.23+01	ug/g	CAG006
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD002
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD002
			Parathion	LT 9.0 -01	ug/g	CAD002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	CAD002

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants

Bor Ing Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CSD304	11.5-12.5	Soil	Tetrachloroethene	1. +01	ug/g	CAFO04
			Trichloroethene	LT 3. -01	ug/g	CAFO04
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAFO04
			Zinc	8.25+01	ug/g	CAG006
1002CSD305	11.5-12.5	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	CAFO05
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAFO05
			1,1-Dichloroethane	LT 9. -01	ug/g	CAFO05
			1,2-Dichloroethane	LT 3. -01	ug/g	CAFO05
			1,2-Dichloroethane	LT 3. -01	ug/g	CAFO05
			m-Xylene	LT 7. -01	ug/g	CAFO05
			Aldrin	LT 3.0 -01	ug/g	CAD003
			Arsenic	3.42+00	ug/g	BZ2023
			Atrazine	LT 3.0 -01	ug/g	CAD003
			Bicycloheptadiene	LT 3. -01	ug/g	CAFO05
			Benzene	LT 3. -01	ug/g	CAFO05
			Carbon Tetrachloride	LT 3. -01	ug/g	CAFO05
			Cadmium	LT 7.36-01	ug/g	CAG007
			Methylene Chloride	LT 7. -01	ug/g	CAFO05
			Chloroform	LT 3. -01	ug/g	CAFO05
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD003
			Chlorobenzene	LT 3. -01	ug/g	CAFO05
			Chloroform	LT 2.0 +00	ug/g	CAD003
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD003
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD003
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD003
			Chromium	1.36+01	ug/g	CAG007
			Copper	3.81+01	ug/g	CAG007
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD003
			Dibromochloropropane	LT 4. -01	ug/g	CAFO05
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD003
			Dicyclopentadiene	LT 3. -01	ug/g	CAFO05
			Vapone	LT 3.0 +00	ug/g	CAD003
			Dibutylpropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD003
			Dithiane	LT 4.0 -01	ug/g	CAD003

Note: Results for some parameters may appear in more than one analytical fraction.

fbasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0305	11.5-12.5	Soil	Dieldrin	LT 3.0 -01	ug/g	CAD003
			Dimethyldisulfide	LT 8. -01	ug/g	CAF005
			Endrin	LT 5.0 -01	ug/g	CAD003
			Ethylbenzene	LT 3. -01	ug/g	CAF005
			Mercury	LT 5.00-02	ug/g	CAI007
			Isodrin	LT 3.0 -01	ug/g	CAD003
			Toluene	LT 3. -01	ug/g	CAF005
			Methylisobutyl Ketone	LT 3. -01	ug/g	CAF005
			Malathion	LT 7.0 -01	ug/g	CAD003
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD003
			Lead	LT 8.38+00	ug/g	CAG007
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD003
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD003
			Parathion	LT 9.0 -01	ug/g	CAD003
1002CS0306	11.5-12.5	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	CAD003
			Tetrachloroethene	LT 3. -01	ug/g	CAF005
			Trichloroethene	LT 3. -01	ug/g	CAF005
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF005
			Zinc	1.03+02	ug/g	CAG007
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAL002
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAL002
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAL002
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAL002
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAL002
			m-Xylene	LT 7.4 -01	ug/g	CAL002
			Aldrin	LT 3.0 -01	ug/g	CAD007
			Arsenic	LT 2.50+00	ug/g	CAH007
			Atrazine	LT 3.0 -01	ug/g	CAD007
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAL002
			Benzene	LT 2.5 -01	ug/g	CAL002
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAL002
			Cadmium	LT 7.36-01	ug/g	CAG011

Note: Results for some parameters may appear in more than one analytical fraction.

Esasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Task 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0306	11.5-12.5	Soil	Methylene Chloride	LT 1.5 +00	ug/g	CAL002
			Chloroform	LT 2.9 -01	ug/g	CAL002
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD007
			Chloroacetic Acid	LT 3.55+01	ug/g	CAL006
			Chlorobenzene	LT 1.5 +00	ug/g	CAL002
			Chlordane	LT 2.0 +00	ug/g	CAD007
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD007
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD007
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD007
			Chromium	1.37+01	ug/g	CAG011
			Copper	1.90+01	ug/g	CAG011
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD007
			Dibromochloropropane	LT 2.4 +00	ug/g	CAL002
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD007
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAL002
			Vapona	LT 3.0 +00	ug/g	CAD007
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD007
			Dithiane	LT 4.0 -01	ug/g	CAD007
			Dieldrin	LT 3.0 -01	ug/g	CAD007
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAL002
			Endrin	LT 5.0 -01	ug/g	CAD007
			Ethylbenzene	LT 3.8 -01	ug/g	CAL002
			Mercury	1.99-01	ug/g	CAI011
			Isodrin	LT 3.0 -01	ug/g	CAD007
			Toluene	LT 2.5 -01	ug/g	CAL002
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAL002
			Malathion	LT 7.0 -01	ug/g	CAD007
			1,4-Oxethiane	LT 3.0 -01	ug/g	CAD007
			Lead	LT 8.38+00	ug/g	CAG011
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD007
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD007
			Parathion	LT 9.0 -01	ug/g	CAD007
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6.0 -01	ug/g	CAD007

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Etasco Services Incorporated

Task 10 Chemical Sewers -- South Plants

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0306	11.5-12.5	Soil	Tetrachloroethene	LT 2.5 -01	ug/g	CAL002
			Thiodiglycol	LT 4.20+00	ug/g	CAK006
			Trichloroethene	LT 5.4 -01	ug/g	CAL002
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAL002
			Zinc	LT 5.94+01	ug/g	CAG011
1002CS0306	15.5-16.5	Soil	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAL003
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAL003
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAL003
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAL003
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAL003
			m-Xylene	LT 7.4 -01	ug/g	CAL003
			Aldrin	LT 3.0 -01	ug/g	CAD008
			Arsenic	LT 2.50+00	ug/g	CAH008
			Atrazine	LT 3.0 -01	ug/g	CAD008
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAL003
			Benzene	LT 2.5 -01	ug/g	CAL003
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAL003
			Cadmium	LT 7.36-01	ug/g	CAG012
			Methylene Chloride	LT 1.5 +00	ug/g	CAL003
			Chloroform	LT 2.9 -01	ug/g	CAL003
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD008
			Chloroacetic Acid	LT 3.55+01	ug/g	CAK007
			Chlorobenzene	LT 1.5 +00	ug/g	CAL003
			Chlordane	LT 2.0 +00	ug/g	CAD008
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD008
			p-Chlorophenylmethyl Sulfonide	LT 3.0 -01	ug/g	CAD008
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD008
			Chromium	LT 6.53+00	ug/g	CAG012
			Copper	LT 3.42+01	ug/g	CAG012
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD008
			Dibromochloropropane	LT 2.4 +00	ug/g	CAL003
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD008
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAL003

Note: Results for some parameters may appear in more than one analytical fraction.

Funson Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0306	15.5-16.5	Soil	Vapors	LT 3.0 +01	ug/g	CAD008
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD008
			Dithiane	LT 4.0 -01	ug/g	CAD008
			Dieldrin	LT 3.0 -01	ug/g	CAD008
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAL003
			Endrin	LT 5.0 -01	ug/g	CAD008
			Ethylbenzene	LT 3.8 -01	ug/g	CAL003
			Mercury	LT 5.00-02	ug/g	CAI012
			Isodrin	LT 3.0 -01	ug/g	CAD008
			Toluene	LT 2.5 -01	ug/g	CAL003
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAL003
			Malethion	LT 7.0 -01	ug/g	CAD008
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD008
			Lead	LT 8.38+00	ug/g	CAG012
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD008
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD008
1002CS0306	20.5-21.5	Soil	Parathion	LT 9.0 -01	ug/g	CAD008
			2-(chloro-1(2,4-Dichlorophenyl) Vinyl)diethyl Phosphates	LT 6.0 -01	ug/g	CAD008
			Tetrachloroethene	LT 2.5 -01	ug/g	CAL003
			Thiodiglycol	LT 4.20+00	ug/g	CAK007
			Trichloroethene	LT 5.4 -01	ug/g	CAL003
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAL003
			Zinc	9.19+01	ug/g	CAG012
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAL004
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAL004
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAL004
			1,2-Dichloroethene	LT 1.7 +00	ug/g	CAL004
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAL004
			m-Xylene	LT 7.4 -01	ug/g	CAL004
			Aldrin	LT 2.5 -01	ug/g	CAD009
			Arsenic	LT 2.50+00	ug/g	CAH009
			Atrazine	LT 2.5 -01	ug/g	CAD009

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C50306	20.5-21.5	Soil	Bicycloheptadiene	LT 3.6 -01	ug/g	CAL004
			Benzene	LT 2.5 -01	ug/g	CAL004
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAL004
			Cadmium	LT 7.36-01	ug/g	CAG013
			Methylene Chloride	LT 1.5 +00	ug/g	CAL004
			Chloroform	LT 2.9 -01	ug/g	CAL004
			Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	CAD009
			Chloroacetic Acid	LT 3.55+01	ug/g	CAK008
			Chlorobenzene	LT 1.5 +00	ug/g	CAL004
			Chlordane	LT 1.7 +00	ug/g	CAD009
			p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	CAD009
			p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	CAD009
			p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	CAD009
			Chromium	LT 6.53+00	ug/g	CAG013
			Copper	3.30+01	ug/g	CAG013
			Dibromochloropropane	LT 2.8 -01	ug/g	CAD009
			Dibromochloropropane	LT 2.4 +00	ug/g	CAL004
			Dicyclopentadiene	LT 1.1 +00	ug/g	CAD009
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAL004
			Vapona	LT 3.0 +00	ug/g	CAD009
			Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	CAD009
			Dithiane	LT 3.6 -01	ug/g	CAD009
			Dieldrin	LT 2.5 -01	ug/g	CAD009
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAL004
			Endrin	LT 4.6 -01	ug/g	CAD009
			Ethylbenzene	LT 3.8 -01	ug/g	CAL004
			Mercury	LT 5.00-02	ug/g	CAI013
			Isodrin	LT 2.9 -01	ug/g	CAD009
			Toluene	LT 2.5 -01	ug/g	CAL004
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAL004
			Malathion	LT 7.1 -01	ug/g	CAD009
			1,4-Oxathiane	LT 2.5 -01	ug/g	CAD009
			Lead	LT 8.38+00	ug/g	CAG013
			Dichlorodiphenylethane	LT 5.7 -01	ug/g	CAD009

Note: Results for some parameters may appear in more than one analytical fraction.

Eberco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers --- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C50306	20.5-21.5	Soil	Dichlorodiphenyltrichloroethane	LT 4.7 -01	ug/g	CAD009
			Parathion	LT 8.5 -01	ug/g	CAD009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	CAD009
			Tetrachloroethene	LT 2.5 -01	ug/g	CAL004
			Thiodiglycol	LT 4.20+00	ug/g	CAK008
			Trichloroethene	LT 5.4 -01	ug/g	CAL004
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAL004
			Zinc	7.75+01	ug/g	CAG013
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAL005
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAL005
1002C50306	25.5-26.5	Soil	1,1-Dichloroethane	LT 1.7 +00	ug/g	CAL005
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAL005
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAL005
			m-Xylene	LT 7.4 -01	ug/g	CAL005
			Aldrin	LT 3.0 -01	ug/g	CAD010
			Arsenic	LT 2.50+00	ug/g	CAH010
			Atrazine	LT 3.0 -01	ug/g	CAD010
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAL005
			Benzene	LT 2.5 -01	ug/g	CAL005
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAL005
			Cadmium	LT 7.36-01	ug/g	CAG014
			Methylene Chloride	LT 1.5 +00	ug/g	CAL005
			Chloroform	LT 2.9 -01	ug/g	CAL005
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD010
			Chloroacetic Acid	LT 3.55+01	ug/g	CAK009
			Chlorobenzene	LT 1.5 +00	ug/g	CAL005
			Chloroform	LT 2.0 +00	ug/g	CAD010
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD010
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD010
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD010
			Chromium	LT 6.53+00	ug/g	CAG014
			Copper	4.62+01	ug/g	CAG014

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0306	25.5-26.5	Soil	Dibromochloropropane	LT 3.0 -01	ug/g	CAD010
			Dibromochloropropane	LT 2.4 +00	ug/g	CAL005
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD010
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAL005
			Vapona	LT 3.0 +00	ug/g	CAD010
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD010
			Dithiane	LT 4.0 -01	ug/g	CAD010
			Dieldrin	LT 3.0 -01	ug/g	CAD010
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAL005
			Endrin	LT 5.0 -01	ug/g	CAD010
			Ethylbenzene	LT 3.8 -01	ug/g	CAL005
			Mercury	LT 5.00-02	ug/g	CAI014
			Isodrin	LT 3.0 -01	ug/g	CAD010
			Toluene	LT 2.5 -01	ug/g	CAL005
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAL005
			Malathion	LT 7.0 -01	ug/g	CAD010
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD010
			Lead	LT 8.38+00	ug/g	CAG014
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD010
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD010
1002CS0307	11.5-12.5	Soil	Parathion	LT 9.0 -01	ug/g	CAD010
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6.0 -01	ug/g	CAD010
			Tetrachloroethene	LT 2.5 -01	ug/g	CAL005
			Thiodiglycol	LT 4.20+00	ug/g	CAK009
			Trichloroethene	LT 5.4 -01	ug/g	CAL005
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAL005
			Zinc	7.52+01	ug/g	CAG014
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAE006
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAE006
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAE006
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAE006
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAE006

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

Phasco Services Incorporated
Summary of Analytical Results

Task 10

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
10020S0307	11.5-12.5	Soil	m-Xylene	LT 7.4 -01	ug/g	CAE006
			Aldrin	LT 3. -01	ug/g	CAC006
			Arsenic	LT 2.50+00	ug/g	BZ017
			Atrazine	LT 3. -01	ug/g	CAC006
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAE006
			Benzene	LT 2.5 -01	ug/g	CAE006
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAE006
			Cadmium	LT 7.36-01	ug/g	CAAD17
			Methylene Chloride	LT 1.5 +00	ug/g	CAE006
			Chloroform	LT 2.9 -01	ug/g	CAE006
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	CAC006
			Chloroacetic Acid	LT 3.55+01	ug/g	BZ012
			Chlorobenzene	LT 1.5 +00	ug/g	CAE006
			Chlordane	LT 6. -01	ug/g	CAC006
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	CAC006
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	CAC006
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	CAC006
			Chromium	1.24+01	ug/g	CAAD17
			Copper	2.81+01	ug/g	CAAD17
			Dibromochloropropane	LT 3. -01	ug/g	CAC006
			Dibromochloropropane	LT 2.4 +00	ug/g	CAE006
			Dicyclopentadiene	LT 4. -01	ug/g	CAC006
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAE006
			Vapona	LT 3. -01	ug/g	CAC006
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	CAC006
			Dithiane	LT 7. +00	ug/g	CAC006
			Dieldrin	LT 3. -01	ug/g	CAC006
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAE006
			Endrin	LT 3. -01	ug/g	CAC006
			Ethylbenzene	LT 3.8 -01	ug/g	CAE006
			Mercury	LT 5.00-02	ug/g	BZ017
			Isodrin	LT 3. -01	ug/g	CAC006
			Toluene	LT 2.5 -01	ug/g	CAE006
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAE006

Note: Results for some parameters may appear in more than one analytical fraction.

Phaseo Services Incorporated Rocky Mountain Arsenal Program 01/27/88
 Summary of Analytical Results Task 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C50307	11.5-12.5	Soil	Malathion	LT 3. -01	ug/g	CAC006
			1,4-Oxathiane	LT 6. +00	ug/g	CAC006
			Lead	LT 8.38+00	ug/g	CAA017
			Dichlorodiphenylethane	LT 3. -01	ug/g	CAC006
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	CAC006
			Parathion	LT 4. -01	ug/g	CAC006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	CAC006
			Tetrachloroethene	LT 2.5 -01	ug/g	CAE006
			Thiodiglycol	LT 4.20+00	ug/g	BZW012
			Trichloroethene	LT 5.4 -01	ug/g	CAE006
1002C50307	15.5-16.5	Soil	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAE006
			Zinc	7.21+01	ug/g	CAA017
			1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAE007
			1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAE007
			1,1-Dichloroethane	LT 1.7 +00	ug/g	CAE007
			1,2-Dichloroethane	LT 1.7 +00	ug/g	CAE007
			1,2-Dichloroethane	LT 5.6 -01	ug/g	CAE007
			m-Xylene	LT 7.4 -01	ug/g	CAE007
			Aldrin	LT 3. -01	ug/g	CAC007
			Arsenic	3.48+00	ug/g	BZ2018
			Atrazine	LT 3. -01	ug/g	CAC007
			Bicycloheptadiene	LT 3.6 -01	ug/g	CAE007
			Benzene	LT 2.5 -01	ug/g	CAE007
			Carbon Tetrachloride	LT 2.5 -01	ug/g	CAE007
			Cadmium	LT 7.36-01	ug/g	CAA018
			Methylene Chloride	LT 1.5 +00	ug/g	CAE007
			Chloroform	LT 2.9 -01	ug/g	CAE007
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	CAC007
			Chlorobenzene	LT 1.5 +00	ug/g	CAE007
			Chlordane	LT 6. -01	ug/g	CAC007
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	CAC007
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	CAC007

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C60307	15.5-16.5	Soil	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	CAC007
			Chromium	1.20+01	ug/g	CAAD18
			Copper	3.29+01	ug/g	CAAD18
			Dibromochloropropane	LT 3. -01	ug/g	CAC007
			Dibromochloropropane	LT 2.4 +00	ug/g	CAED07
			Dicyclopentadiene	LT 4. -01	ug/g	CAC007
			Dicyclopentadiene	LT 6.4 -01	ug/g	CAED07
			Vapona	LT 3. -01	ug/g	CAC007
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	CAC007
			Dithiane	LT 7. +00	ug/g	CAC007
			Dieldrin	LT 3. -01	ug/g	CAC007
			Dimethyldisulfide	LT 2.0 +01	ug/g	CAED07
			Endrin	LT 3. -01	ug/g	CAC007
			Ethylbenzene	LT 3.8 -01	ug/g	CAED07
			Mercury	LT 5.00-02	ug/g	BZX018
			Isodrin	LT 3. -01	ug/g	CAC007
			Toluene	LT 2.5 -01	ug/g	CAED07
			Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAED07
			Malathion	LT 3. -01	ug/g	CAC007
			1,4-Oxethiane	LT 6. +00	ug/g	CAC007
1002C60307	20.5-21.5	Soil	Lead	LT 8.3A+00	ug/g	CAAD18
			Dichlorodiphenylethane	LT 3. -01	ug/g	CAC007
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	CAC007
			Parathion	LT 4. -01	ug/g	CAC007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	CAC007
			Tetrachloroethene	LT 2.5 -01	ug/g	CAED07
			Trichloroethene	LT 5.4 -01	ug/g	CAED07
			Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAED07
			Zinc	8.88+01	ug/g	CAAD18
			1,1,1-Trichloroethane	LT 3. -01	ug/g	CAED06
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAED06
			1,1-Dichloroethane	LT 2. -01	ug/g	CAED06

Note: Results for some parameters may appear in more than one analytical fraction.

Phase Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002C503N7	20.5-21.5	Soil	1,2-Dichloroethene	LT 3. -01	ug/g	CAF006
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF006
			m-Xylene	LT 7. -01	ug/g	CAF006
			Aldrin	LT 3.0 -01	ug/g	CAD004
			Arsenic	7.13+00	ug/g	BZ2024
			Atrazine	LT 3.0 -01	ug/g	CAD004
			Bicycloheptadiene	LT 3. -01	ug/g	CAF006
			Benzene	LT 3. -01	ug/g	CAF006
			Carbon Tetrachloride	LT 3. -01	ug/g	CAF006
			Cadmium	LT 7.36-01	ug/g	CAG008
			Methylene Chloride	LT 7. -01	ug/g	CAF006
			Chloroform	LT 3. -01	ug/g	CAF006
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD004
			Chlorobenzene	LT 3. -01	ug/g	CAF006
			Chlordane	LT 2.0 +00	ug/g	CAD004
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD004
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD004
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD004
			Chromium	LT 6.53+00	ug/g	CAG008
			Copper	3.32+01	ug/g	CAG008
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD004
			Dibromochloropropane	LT 4. -01	ug/g	CAF006
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD004
			Dicyclopentadiene	LT 3. -01	ug/g	CAF006
			Vapona	LT 3.0 +00	ug/g	CAD004
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD004
			Dithiene	LT 4.0 -01	ug/g	CAD004
			Dieldrin	LT 3.0 -01	ug/g	CAD004
			Dimethyldisulfide	LT 8. -01	ug/g	CAF006
			Endrin	LT 5.0 -01	ug/g	CAD004
			Ethylbenzene	LT 3. -01	ug/g	CAF006
			Mercury	LT 5.00-02	ug/g	CAI008
			Isodrin	LT 3.0 -01	ug/g	CAD004
			Toluene	LT 3. -01	ug/g	CAF006

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 10 Chemical Sewers -- South Plants

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0307	20.5-21.5	Soil	Methylisobutyl Ketone	LT 3. -01	ug/g	CAF006
			Malathion	LT 7.0 -01	ug/g	CAD004
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAG004
			Lead	LT 8.38+00	ug/g	CAG008
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD004
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD004
			Parathion	LT 9.0 -01	ug/g	CAD004
			2-Chloro-1(2,4-Dichlorophenyl)	LT 6.0 -01	ug/g	CAD004
			Vinylidethlyl Phosphates	LT 3. -01	ug/g	CAF006
			Tetrachloroethene	LT 3. -01	ug/g	CAF006
1002CS0307	25.5-26.5	Soil	Trichloroethene	LT 3. -01	ug/g	CAF006
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF006
			Zinc	7.72+01	ug/g	CAG008
			1,1,1-Trichloroethene	LT 3. -01	ug/g	CAF007
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAF007
			1,1-Dichloroethane	LT 9. -01	ug/g	CAF007
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF007
			m-Xylene	LT 7. -01	ug/g	CAF007
			Aldrin	LT 3.0 -01	ug/g	CAD005
			Arsenic	LT 2.50+00	ug/g	CAH005
			Atrazine	LT 3.0 -01	ug/g	CAD005
			Bicycloheptadiene	LT 3. -01	ug/g	CAF007
			Benzene	LT 3. -01	ug/g	CAF007
			Carbon Tetrachloride	LT 3. -01	ug/g	CAF007
			Cadmium	LT 7.36-01	ug/g	CAG009
			Methylene Chloride	LT 7. -01	ug/g	CAF007
			Chloroform	LT 3. -01	ug/g	CAF007
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD005
			Chlorobenzene	LT 3. -01	ug/g	CAF007
			Chloroethane	LT 2.0 +00	ug/g	CAD005
			p-Chloroethenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD005
			p-Chlorophenylmethyl Sulfide	LT 3.0 -01	ug/g	CAD005

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0307	25.5-26.5	Soil	p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAD005
			Chromium	1.14+01	ug/g	CAG009
			Copper	2.79+01	ug/g	CAG009
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD005
			Dibromochloropropane	LT 4. -01	ug/g	CAF007
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD005
			Dicyclopentadiene	LT 3. -01	ug/g	CAF007
			Vapona	LT 3.0 +00	ug/g	CAD005
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD005
			Dithiane	LT 4.0 -01	ug/g	CAD005
			Dieldrin	LT 3.0 -01	ug/g	CAD005
			Dimethyldisulfide	LT 8. -01	ug/g	CAF007
			Endrin	LT 5.0 -01	ug/g	CAD005
			Ethylbenzene	LT 3. -01	ug/g	CAF007
			Mercury	LT 5.00-02	ug/g	CA1009
			Isodrin	LT 3.0 -01	ug/g	CAD005
			Toluene	LT 3. -01	ug/g	CAF007
			Methylisobutyl Ketone	LT 3. -01	ug/g	CAF007
			Malathion	LT 7.0 -01	ug/g	CAD005
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD005
1002CS0308	10.8	Soil	Lead	LT 8.38+00	ug/g	CAG009
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD005
			Dichlorodiphenyltrichloro-ethane	LT 5.0 -01	ug/g	CAD005
			Parathion	LT 9.0 -01	ug/g	CAD005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	CAD005
			Tetrachloroethene	LT 3. -01	ug/g	CAF007
			Trichloroethene	LT 3. -01	ug/g	CAF007
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF007
			Zinc	9.63+01	ug/g	CAG009
			1,1,1-Trichloroethane	LT 3. -01	ug/g	CAF008
			1,1,2-Trichloroethane	LT 3. -01	ug/g	CAF008
			1,1-Dichloroethane	LT 9. -01	ug/g	CAF008

Note: Results for some parameters may appear in more than one analytical fraction.

Elbasco Services Incorporated
Summary of Analytical Results

Inst 10 Rocky Mountain Arsenal Program
Chemical Sewers -- South Plants

01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0308	10.8	Soil	1,2-Dichloroethene	LT 3. -01	ug/g	CAF008
			1,2-Dichloroethane	LT 3. -01	ug/g	CAF008
			m-Xylene	LT 7. -01	ug/g	CAF008
			Aldrin	LT 3.0 -01	ug/g	CAD006
			Arsenic	3.61+00	ug/g	CAH006
			Atrazine	LT 3.0 -01	ug/g	CAD006
			Bicycloheptadiene	LT 3. -01	ug/g	CAF008
			Benzene	LT 3. -01	ug/g	CAF008
			Carbon Tetrachloride	LT 3. -01	ug/g	CAF008
			Cadmium	LT 7.36-01	ug/g	CAG010
			Methylene Chloride	LT 7. -01	ug/g	CAF008
			Chloroform	LT 3. -01	ug/g	CAF008
			Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAD006
			Chloroacetic Acid	LT 3.55+01	ug/g	CAK005
			Chlorobenzene	LT 3. -01	ug/g	CAF008
			Chlordane	LT 2.0 +00	ug/g	CAD006
			p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAD006
			p-Chlorophenylmethyl Sulfoxide	LT 3.0 -01	ug/g	CAD006
			p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAI006
			Chromium	1.10+01	ug/g	CAG010
			Copper	1.10+01	ug/g	CAG010
			Dibromochloropropane	LT 3.0 -01	ug/g	CAD006
			Dibromochloropropane	LT 4. -01	ug/g	CAF008
			Dicyclopentadiene	LT 1.0 +00	ug/g	CAD006
			Dicyclopentadiene	LT 3. -01	ug/g	CAF008
			Vapona	LT 3.0 +00	ug/g	CAD006
			Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAD006
			Dithiane	LT 4.0 -01	ug/g	CAD006
			Dieldrin	LT 3.0 -01	ug/g	CAD006
			Nimethyldisulfide	LT 8. -01	ug/g	CAF008
			Endrin	LT 5.0 -01	ug/g	CAD006
			Ethylbenzene	LT 3. -01	ug/g	CAF008
			Mercury	LT 5.00-02	ug/g	CAI010
			Isodrin	LT 3.0 -01	ug/g	CAD006

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002CS0308	10.8	Soil	Toluene	LT 3. -01	ug/g	CAF008
			Methylisobutyl Ketone	LT 3. -01	ug/g	CAF008
			Malathion	LT 7.0 -01	ug/g	CAD006
			1,4-Oxathiane	LT 3.0 -01	ug/g	CAD006
			Lead	LT 8.38+00	ug/g	CAG010
			Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAD006
			Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	CAD006
			Parathion	LT 9.0 -01	ug/g	CAD006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.0 -01	ug/g	CAD006
			Tetrachloroethene	LT 3. -01	ug/g	CAF008
1001MKE021	5.9-6.8	Soil	Thiodiglycol	LT 4.20+00	ug/g	CAK005
			Trichloroethene	LT 3. -01	ug/g	CAF008
			Ortho- & Para-Xylene	LT 3. -01	ug/g	CAF008
			Zinc	4.49+01	ug/g	CAG010
			Aldrin	1.0 +02	ug/g	BOX002
			Arsenic	1.40+02	ug/g	BOX018
			Atrazine	LT 3. -01	ug/g	BOX002
			Cadmium	4.2 +00	ug/g	BOX018
			Hexachlorocyclopentadiene	2.5 +01	ug/g	BOX002
			Chlordane	LT 2. +00	ug/g	BOX002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX002
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOX002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX002
			Chromium	9.7 +00	ug/g	BOX018
			Copper	5.5 +01	ug/g	BOX018
			Dibromochloropropane	3.17+04	ug/g	BOX011
			Dibromochloropropane	LT 3. -01	ug/g	BOX002
			Dicyclopentadiene	LT 1. +00	ug/g	BOX002
			Vapona	LT 3. +00	ug/g	BOX002
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOX002
			Dithiane	LT 4. -01	ug/g	BOX002
			Bieldrin	7. +01	ug/g	BOX002

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE021	5.9-6.8	Soil	Endrin	LT 5. -01	ug/g	BOX002
			Mercury	2.34+00	ug/g	BOX018
			Isodrin	2.5 +01	ug/g	BOX002
			Malathion	LT 7. -01	ug/g	BOX002
			1,4-Oxathiane	LT 3. -01	ug/g	BOX002
			Lead	7.3 +01	ug/g	BOX018
			Dichlorodiphenylethane	LT 6. -01	ug/g	BOX002
			Dichlorodiphenyltrichloroethane	2.5 +01	ug/g	BOX002
			Parathion	LT 9. -01	ug/g	BOX002
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	2.5 +01	ug/g	BOX002
1001MKE022	5.7-6.5	Soil	Zinc	8.6 +01	ug/g	BOX018
			Aldrin	9.6 +01	ug/g	BOX003
			Arsenic	1.86+02	ug/g	BOX019
			Atrazine	LT 3. -01	ug/g	BOX003
			Cadmium	5.8 +00	ug/g	BOX019
			Hexachlorocyclopentadiene	1. +00	ug/g	BOX003
			Chlordane	LT 2. +00	ug/g	BOX003
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX003
			p-Chlorophenylmethyl Sulfonide	LT 3. -01	ug/g	BOX003
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX003
			Chromium	1.1 +01	ug/g	BOX019
			Copper	1.5 +03	ug/g	BOX019
			Dibromochloropropane	3.67+02	ug/g	BOX012
			Tribromochloropropane	8.1 +01	ug/g	BOX003
			Dicyclopentadiene	LT 1. +00	ug/g	BOX003
			Vapone	LT 3. +00	ug/g	BOX003
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOX003
			Dithiane	LT 4. -01	ug/g	BOX003
			Dieldrin	1. +01	ug/g	BOX003
			Endrin	LT 5. -01	ug/g	BOX003
			Mercury	7.00-01	ug/g	BOX019

Note: Results for some parameters may appear in more than one analytical fraction.

Ethaco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Task 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE022	5.7-6.5	Soil	Isodrin	1. +01	ug/g	BOX003
			Malathion	LT 7. -01	ug/g	BOX003
			1,4-Oxathiane	LT 3. -01	ug/g	BOX003
			Lead	8.9 +01	ug/g	BOX019
			Dichlorodiphenylethane	LT 6. -01	ug/g	BOX003
			Dichlorodiphenyltrichloroethane	7. +00	ug/g	BOX003
			Parathion	2. +01	ug/g	BOX003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BOX003
			Zinc	1.2 +02	ug/g	BOX019
			Aldrin	1. +02	ug/g	BOX004
			Arsenic	1.32+02	ug/g	BOX020
			Atrazine	1. +01	ug/g	BOX004
			Cadmium	5.8 +00	ug/g	BOX020
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BOX004
1001MKE023	5.8-6.8	Soil	Chlordane	LT 2. +00	ug/g	BOX004
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX004
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOX004
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX004
			Chromium	9.8 +00	ug/g	BOX020
			Copper	8.4 +01	ug/g	BOX020
			Dibromochloropropane	6.90+03	ug/g	BOX013
			Dibromochloropropane	1.0 +02	ug/g	BOX004
			Dicyclopentadiene	LT 1. +00	ug/g	BOX004
			Vapone	LT 3. +00	ug/g	BOX004
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOX004
			Dithiane	LT 4. -01	ug/g	BOX004
			Dieldrin	3. +01	ug/g	BOX004
			Endrin	LT 5. -01	ug/g	BOX004
			Mercury	4.70+00	ug/g	BOX020
			Isodrin	2.5 +01	ug/g	BOX004
			Malathion	LT 7. -01	ug/g	BOX004
			1,4-Oxathiane	LT 3. -01	ug/g	BOX004

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
10U1MKF023	5.8-6.8	Soil	Lead	3.8 +01	ug/g	BOU020
			Dichlorodiphenylethane	LT 6. -01	ug/g	BOX004
			Dichlorodiphenyltrichloro-ethane	2.3 +01	ug/g	BOX004
			Parathion	LT 9. -01	ug/g	BOX004
			2-Chloro-1(2,4-dichlorophenyl) Vinylidethyl Phosphates	2.5 +01	ug/g	BOX004
			Zinc	2.3 +02	ug/g	BOU020
			Aldrin	1. +02	ug/g	BRC002
			Arsenic	1.47+02	ug/g	BRU016
			Atrazine	4. +00	ug/g	BRC002
			Cadmium	3.1 +00	ug/g	BRK005
10U1MKE031	8.7-9.5	Soil	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRC002
			Chlordane	LT 2. +00	ug/g	BRC002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRC002
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRC002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRC002
			Chromium	9.7 +00	ug/g	BRK005
			Copper	1.8 +01	ug/g	BRK005
			Dibromochloropropane	7.0 +01	ug/g	BRC002
			Dibromochloropropane	9.48+01	ug/g	BRG005
			Dicyclopentadiene	LT 1. +00	ug/g	BRC002
			Vapona	LT 3. +00	ug/g	BRC002
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRC002
			Dithiane	LT 4. -01	ug/g	BRC002
			Dieldrin	1. +02	ug/g	BRC002
			Endrin	LT 5. -01	ug/g	BRC002
			Mercury	5.82-01	ug/g	BRJ005
			Isodrin	2.5 +01	ug/g	BRC002
			Malathion	LT 7. -01	ug/g	BRC002
			1,4-Oxathiane	LT 3. -01	ug/g	BRC002
			Lead	2.4 +01	ug/g	BRK005
			Dichlorodiphenylethane	4. +00	ug/g	BRJ002

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE031	8.7-9.5	Soil	Dichlorodiphenyltrichloroethane	2.5 +01	ug/g	BRC002
			Parathion	LT 9. -01	ug/g	BRC002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	4. +00	ug/g	BRC002
			Zinc	3.8 +01	ug/g	BRK005
			Aldrin	1. +02	ug/g	BRC003
1001MKE033	9.4-9.9	Soil	Arsenic	LT 2.50+00	ug/g	BRU017
			Atrazine	LT 3. -01	ug/g	BRC003
			Cadmium	2.8 +00	ug/g	BRK006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRC003
			Chlordane	LT 2. +00	ug/g	BRC003
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRC003
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRC003
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRC003
			Chromium	1.1 +01	ug/g	BRK006
			Copper	7.5 +01	ug/g	BRK006
			Dibromochloropropane	9. +00	ug/g	BRC003
			Dibromochloropropane	1.31+01	ug/g	BRG006
			Dicyclopentadiene	LT 1. +00	ug/g	BRC003
			Vapona	LT 3. +00	ug/g	BRC003
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRC003
			Dithiane	LT 4. -01	ug/g	BRC003
			Dieldrin	2. +01	ug/g	BRC003
			Endrin	LT 5. -01	ug/g	BRC003
			Mercury	2.66-01	ug/g	BRJ006
			Isodrin	2.5 +01	ug/g	BRC003
			Malethion	LT 7. -01	ug/g	BRC003
			1,4-Oxathiane	LT 3. -01	ug/g	BRC003
			Lead	1.1 +01	ug/g	BRK006
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRC003
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BRC003
			Parathion	LT 9. -01	ug/g	BRK003

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKEU33	9.6-9.9	Soil	2-Chloro-1(2,4-Dichlorophenyl) Vinylidylethyl Phosphates	2. +00	ug/g	BRK003
			Zinc	8.3 +01	ug/g	BRK006
1001MKED42	7.7-8.2	Soil	Aldrin	LT 3. -01	ug/g	BOW005
			Arsenic	1.22+02	ug/g	BOW015
			Atrazine	LT 3. -01	ug/g	BOW005
			Cadmium	5.3 +00	ug/g	BOW015
			Hexachlorocyclopentadiene	2. +01	ug/g	BOW005
			Chlordane	LT 2. +00	ug/g	BOW005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOW005
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOW005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOW005
			Chromium	LT 5.2 +00	ug/g	BOW015
			Copper	3.6 +01	ug/g	BOW015
			Dibromochloropropane	5.44+02	ug/g	BOW008
			Dibromochloropropane	2.3 +02	ug/g	BOW005
			Dicyclopentadiene	LT 1. +00	ug/g	BOW005
			Vapona	LT 3. +00	ug/g	BOW005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOW005
			Dithiane	LT 4. -01	ug/g	BOW005
			Dieldrin	3. +01	ug/g	BOW005
			Endrin	LT 5. -01	ug/g	BOW005
			Mercury	9.19-02	ug/g	BOW015
			Isodrin	3.7 +01	ug/g	BOW005
			Malathion	LT 7. -01	ug/g	BOW005
			1,4-Oxathiane	LT 3. -01	ug/g	BOW005
			Lead	LT 1.3 +01	ug/g	BOW015
			Dichlorodiphenylethane	8. -01	ug/g	BOW005
			Dichlorodiphenyltrichloroethane	1. +01	ug/g	BOW005
			Parathion	LT 2. -01	ug/g	BOW005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidylethyl Phosphates	2. +01	ug/g	BOW005
			Zinc	9.0 +01	ug/g	BOW015

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

Ebasco Services Incorporated

Task 10 Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKED43	7.7-8.2	Soil	Aldrin	2. +01	ug/g	804006
			Arsenic	1.52+02	ug/g	804016
			Atrazine	LT 3. -01	ug/g	804006
			Cadmium	7.7 +00	ug/g	804016
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	804006
			Chlordane	LT 2. +00	ug/g	804006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	804006
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	804006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	804006
			Chromium	LT 5.2 +00	ug/g	804016
			Copper	4.2 +01	ug/g	804016
			Dibromochloropropane	6.99+01	ug/g	804009
			Dibromochloropropane	2. +01	ug/g	804006
			Dicyclopentadiene	LT 1. +00	ug/g	804006
			Vapors	LT 3. +00	ug/g	804006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	804006
			Dithiane	LT 4. -01	ug/g	804006
			Dieldrin	3. +00	ug/g	804006
			Endrin	LT 5. -01	ug/g	804006
			Mercury	3.94-01	ug/g	805016
			Isodrin	2. +00	ug/g	804006
			Malathion	LT 7. -01	ug/g	804006
			1,4-Oxathiane	LT 3. -01	ug/g	804006
			Lead	LT 1.3 +01	ug/g	804016
			Dichlorodiphenylethane	2. +00	ug/g	804006
1001MKED44	7.6-7.9	Soil	Dichlorodiphenyltrichloroethane	4.3 +01	ug/g	804006
			Parathion	LT 9. -01	ug/g	804006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethy] Phosphates	2. +00	ug/g	804006
			Zinc	1.0 +02	ug/g	804016
			Aldrin	2. +01	ug/g	804007
			Arsenic	1.68+02	ug/g	804017

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task ID

Chemical Severs -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKED64	7.6-7.9	Soil	Atrazine	LT 3. -01	ug/g	BQW007
			Cadmium	6.6 +00	ug/g	BQW017
			Hexachlorocyclopentadiene	3.1 +01	ug/g	BQW007
			Chlordane	LT 2. +00	ug/g	BQW007
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BQW007
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BQW007
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BQW007
			Chromium	LT 5.2 +00	ug/g	BQW017
			Copper	3.2 +01	ug/g	BQW017
			Dibromochloropropane	5.96+01	ug/g	BQW010
			Dibromochloropropane	5. +01	ug/g	BQW007
			Dicyclopentadiene	LT 1. +00	ug/g	BQW007
			Vapona	LT 3. +00	ug/g	BQW007
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BQW007
			Dithiane	LT 4. -01	ug/g	BQW007
			Dieldrin	2. +00	ug/g	BQW007
			Endrin	LT 5. -01	ug/g	BQW007
			Mercury	2.2 +00	ug/g	BQW017
			Isodrin	1. +00	ug/g	BQW007
			Malathion	LT 7. -01	ug/g	BQW007
1001MKED61	8.2-8.8	Soil	1,4-Oxathiane	LT 3. -01	ug/g	BQW007
			Lead	LT 1.3 +01	ug/g	BQW017
			Dichlorodiphenylethane	LT 6. -01	ug/g	BQW007
			Dichlorodiphenyltrichloroethane	3.4 +01	ug/g	BQW007
			Parathion	LT 9. -01	ug/g	BQW007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BQW007
			Zinc	7.2 +01	ug/g	BQW017
			Aldrin	2.4 +02	ug/g	BQW002
			Arsenic	7.38+02	ug/g	BQW012
			Atrazine	LT 3. -01	ug/g	BQW002
			Cadmium	3.4 +01	ug/g	BQW012
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BQW002

Note: Results for some parameters may appear in more than one analytical fraction.

Phasco Services Incorporated Rocky Mountain Arsenal Program 01/27/88
 Summary of Analytical Results Task 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKED61	8.2-8.8	Soil	Chlordane	LT 2. +00	ug/g	80W002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	80W002
			p-Chlorophenylmethyl Sulfoxide	LT 3. 01	ug/g	80W002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	80W002
			Chromium	2.1 +01	ug/g	80W012
			Copper	1.5 +02	ug/g	80W012
			Dibromochloropropane	4.37+02	ug/g	80V005
			Dibromochloropropane	3.3 +02	ug/g	80W002
			Dicyclopentadiene	LT 1. +00	ug/g	80W002
			Vapona	LT 3. +00	ug/g	80W002
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	80W002
			Dithiane	LT 4. -01	ug/g	80W002
			Diethrin	LT 3. -01	ug/g	80W002
			Endrin	LT 5. -01	ug/g	80W002
			Mercury	8.59+00	ug/g	80S012
			Isodrin	2. +01	ug/g	80W002
			Malathion	LT 7. -01	ug/g	80W002
			1,4-Oxathiane	LT 3. -01	ug/g	80W002
			Lead	9.7 +01	ug/g	80W012
			Dichlorodiphenylethane	7. +00	ug/g	80W002
1001MKED62	8.2-9.2	Soil	Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	80W002
			Parathion	LT 9. -01	ug/g	80W002
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	8. +00	ug/g	80W002
			Zinc	4.8 +02	ug/g	80W012
			Aldrin	3.0 +02	ug/g	80W003
			Arsenic	5.99+02	ug/g	80T013
			Atrazine	LT 3. -01	ug/g	80W003
			Cadmium	2.7 +01	ug/g	80W013
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	80W003
			Chlordane	LT 2. +00	ug/g	80W003
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	80W003
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	80W003

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Data Services Incorporated

Chemical Sewers - South Plants

Task 10

Summary of Analytical Results

Box Test Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1000MK003	5.7 to 6.0	Soil	Copper	4.3	+01	ROU014
			Dibromochloropropane	5.47	001	ROU017
			Dibromochloropropane	5.3	001	ROU004
			Dibromochloropropane	LT 1.1	+00	ROU016
			Vapors	LT 3.1	+00	ROU004
			Dibromopropylmethyl Phosphonate	LT 1.1	+00	ROU004
			Dibthiane	LT 4.1	-01	ROU004
			Dieldrin	1.1	+01	ROU004
			Dieldrin	LT 5.1	-01	ROU004
			Mercury	1.56	001	ROU014
			Isodrin	4.4	+01	ROU004
			Malathion	LT 7.1	-01	ROU004
			1,4-Dioxathiane	LT 3.1	-01	ROU004
			Lead	1.7	+01	ROU014
1000MK003	5.7 to 6.0	Soil	Dichlorodiphenylethane	LT 6.1	-01	ROU004
			Dichlorodiphenyltrichloroethane	LT 5.1	-01	ROU004
			Perathion	LT 9.1	-01	ROU004
			2-Chloro 1(2,4-Dichlorophenyl) Vinyl Ethyl Phosphates	LT 6.1	-01	ROU004
			Zinc	1.9	+02	ROU014
			Albin	LT 3.1	-01	RR0008
			Arsenic	LT 2.50	+00	RR0008
			Aluminum	LT 5.1	-01	RR0008
			Calcium	LT 7.36	-01	RR0015
			Dibromochloropropane	LT 6.1	-01	RR0008
			Chloroform	LT 2.1	+00	RR0008
			p-Chlorophenylmethyl Sulfide	LT 9.1	-01	RR0008
			p-Chlorophenylmethyl Sulfonate	LT 5.1	-01	RR0008
			m-Chlorophenylmethyl Sulfonate	LT 5.1	-01	RR0008
1000MK003	5.7 to 6.0	Soil	Chromium	1.25	+01	RR0015
			Copper	1.28	+01	RR0015
			Dibromochloropropane	LT 3.1	-01	RR0008
			Dibromochloropropane	LT 1.1	+00	RR0008

Note: Results for some parameters may appear to more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1035MKE071	5.7-6.4	Soil	Vapone	LT 3. +00	ug/g	BR0008
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BR0008
			Dithiane	LT 4. -01	ug/g	BR0008
			Dieldrin	LT 3. -01	ug/g	BR0008
			Endrin	LT 5. -01	ug/g	BR0008
			Mercury	LT 5.00-02	ug/g	BRJ007
			Isodrin	LT 3. -01	ug/g	BR0008
			Malathion	LT 7. -01	ug/g	BR0008
			1,4-Oxathiane	LT 3. -01	ug/g	BR0008
			Lead	1.91+01	ug/g	BR1015
			Dichlorodiphenylethane	LT 6. -01	ug/g	BR0008
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BR0008
			Parathion	LT 9. -01	ug/g	BR0008
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BR0008
			Zinc	4.92+01	ug/g	BR1015
1035MKE072	5.7-6.7	Soil	Aldrin	LT 3. -01	ug/g	BR0009
			Arsenic	LT 5.0 +00	ug/g	BRH005
			Atrazine	LT 3. -01	ug/g	BR0009
			Cadmium	LT 7.36-01	ug/g	BR1016
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BR0009
			Chlordane	LT 2. +00	ug/g	BR0009
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BR0009
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BR0009
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BR0009
			Chromium	1.40+01	ug/g	BR1016
			Copper	1.31+01	ug/g	BR1016
			Dibromochloropropane	LT 3. -01	ug/g	BR0009
			Dicyclopentadiene	LT 1. +00	ug/g	BR0009
			Vapone	LT 3. +00	ug/g	BR0009
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BR0009
			Dithiane	LT 4. -01	ug/g	BR0009

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Chemical Sewers -- South Plants

Ebasco Services Incorporated

Summary of Analytical Results

Task 10

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1035MKE072	5.7-6.7	Soil	Dieldrin	LT 3. -01	ug/g	BRD009
			Endrin	LT 5. -01	ug/g	BRD009
			Mercury	LT 5.00-02	ug/g	BRJ008
			Isodrin	LT 3. -01	ug/g	BRD009
			Malathion	LT 7. -01	ug/g	BRD009
			1,4-Oxathiane	LT 3. -01	ug/g	BRD009
			Lead	1.44+01	ug/g	BR1016
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRD009
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRD009
			Parathion	LT 9. -01	ug/g	BRD009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD009
			Zinc	4.76+01	ug/g	BR1016
			Aldrin	LT 3. -01	ug/g	BRD010
			Arsenic	LT 5.0 +00	ug/g	BRH006
1035MKE073	5.8-6.5	Soil	Atrazine	LT 3. -01	ug/g	BRD010
			Cadmium	LT 7.36-01	ug/g	BR1017
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD010
			Chlordane	LT 2. +00	ug/g	BRD010
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD010
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRD010
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD010
			Chromium	1.46+01	ug/g	BR1017
			Copper	1.55+01	ug/g	BR1017
			Dibromochloropropane	LT 3. -01	ug/g	BRD010
			Dicyclopentadiene	LT 1. +00	ug/g	BRD010
			Vaporin	LT 3. +00	ug/g	BRD010
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD010
			Dithiane	LT 4. -01	ug/g	BRD010
			Dieldrin	LT 3. -01	ug/g	BRD010
			Isodrin	LT 5. -01	ug/g	BRD010
			Mercury	LT 5.00-02	ug/g	BRJ009
			Isodrin	LT 3. -01	ug/g	BRD010

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1035MKE073	5.8-6.5	Soil	Malathion	LT 7. -01	ug/g	BRD010
			1,4-Oxathiane	LT 3. -01	ug/g	BRD010
			Lead	1.48+01	ug/g	BR1017
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRD010
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRD010
1001MKE191	3.6-4.4	Soil	Parathion	LT 9. -01	ug/g	BRD010
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD010
			Zinc	5.69+01	ug/g	BR1017
			Aldrin	LT 3. -01	ug/g	BRD004
			Arsenic	7.12+00	ug/g	BRD006
			Atrazine	LT 3. -01	ug/g	BRD004
			Cadmium	LT 7.36-01	ug/g	BR1005
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD004
			Chlordane	LT 2. +00	ug/g	BRD004
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD004
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRD004
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD004
			Chromium	1.74+01	ug/g	BR1005
			Copper	7.11+01	ug/g	BR1005
			Dibromochloropropane	LT 3. -01	ug/g	BRD004
			Dicyclopentadiene	LT 1. +00	ug/g	BRD004
			Vapona	LT 3. +00	ug/g	BRD004
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD004
			Dithiane	LT 4. -01	ug/g	BRD004
			Dieldrin	LT 3. -01	ug/g	BRD004
			Endrin	LT 5. -01	ug/g	BRD004
			Mercury	3.52+00	ug/g	BR1005
			Isodrin	LT 3. -01	ug/g	BRD004
			Malathion	LT 7. -01	ug/g	BRD004
			1,4-Oxathiane	LT 3. -01	ug/g	BRD004
			Lead	1.33+01	ug/g	BR1005
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRD004

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

(Chemical Sewers -- South Plants)

Roring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE191	3.6-4.4	Soil	Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRC004
			Parathion	LT 9. -01	ug/g	BRC004
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRC004
			Zinc	9.74+01	ug/g	BRI005
			Aldrin	LT 3. -01	ug/g	BRC005
1001MKE192	3.6-4.6	Soil	Arsenic	5.07+00	ug/g	BRU007
			Atrazine	LT 3. -01	ug/g	BRC005
			Cadmium	LT 7.36-01	ug/g	BRI006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRC005
			Chlordane	LT 2. +00	ug/g	BRC005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRC005
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRC005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRC005
			Chromium	LT 6.53+00	ug/g	BRI006
			Copper	4.40+01	ug/g	BRI006
			Dibromochloropropane	LT 3. -01	ug/g	BRC005
			Dicyclopentadiene	LT 1. +00	ug/g	BRC005
			Vapona	LT 3. +00	ug/g	BRC005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRC005
			Dithiane	LT 4. -01	ug/g	BRC005
			Dieldrin	LT 3. -01	ug/g	BRC005
1001MKE193	3.6-4.6	Soil	Endrin	LT 5. -01	ug/g	BRC005
			Mercury	1.75-01	ug/g	BRL006
			Isodrin	LT 3. -01	ug/g	BRC005
			Malathion	LT 7. -01	ug/g	BRC005
			1,4-Oxathiane	LT 3. -01	ug/g	BRC005
			Lead	LT 8.18+00	ug/g	BRI006
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRC005
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRC005
			Parathion	LT 9. -01	ug/g	BRC005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRC005

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers - South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE192	3.6-4.6	Soil	Zinc	9.48+01	ug/g	BR1006
1001MKE193	3.4-4.2	Soil	Aldrin	LT 3. -01	ug/g	BRC006
			Arsenic	1.39+01	ug/g	BRU008
			Atrazine	LT 3. -01	ug/g	BRC006
			Cadmium	LT 7.36-01	ug/g	BR1007
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRC006
			Chlordane	LT 2. +00	ug/g	BRC006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRC006
			p-Chlorophenylmethyl Sulfonide	LT 3. -01	ug/g	BRC006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRC006
			Chromium	LT 6.53+00	ug/g	BR1007
			Copper	4.13+01	ug/g	BR1007
			Dibromochloropropane	LT 3. -01	ug/g	BRC006
			Dicyclopentadiene	LT 1. +00	ug/g	BRC006
			Vapona	LT 3. +00	ug/g	BRC006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRC006
			Dithiane	LT 4. -01	ug/g	BRC006
			Dieldrin	LT 3. -01	ug/g	BRC006
			Endrin	LT 5. -01	ug/g	BRC006
			Mercury	5.40+00	ug/g	BR1007
			Isodrin	LT 3. -01	ug/g	BRC006
			Malethion	LT 7. -01	ug/g	BRC006
			1,4-Oxathiane	LT 3. -01	ug/g	BRC006
			Lead	LT 8.38+00	ug/g	BR1007
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRC006
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BRC006
			Perathion	LT 9. -01	ug/g	BRC006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRC006
1001MKE201	4.2-4.8	Soil	Zinc	8.48+01	ug/g	BR1007
			Aldrin	6. -01	ug/g	BOX005
			Arsenic	4.35+00	ug/g	BOY021

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE201	4.2-4.8	Soil	Atrazine	LT 3. -01	ug/g	BOX005
			Cadmium	LT 7.36-01	ug/g	BRB005
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BOX005
			Chlordane	LT 2. +00	ug/g	BOX005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX005
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOX005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX005
			Chromium	1.42+01	ug/g	BRB005
			Copper	3.22+01	ug/g	BRB005
			Dibromochloropropane	6. -01	ug/g	BOX005
			Dicyclopentadiene	LT 1. +00	ug/g	BOX005
			Vapona	LT 3. +00	ug/g	BOX005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOX005
			Dithiane	LT 4. -01	ug/g	BOX005
			Dieldrin	LT 3. -01	ug/g	BOX005
			Endrin	LT 5. -01	ug/g	BOX005
			Mercury	1.72-01	ug/g	BRB005
			Isodrin	LT 3. -01	ug/g	BOX005
			Malethion	LT 7. -01	ug/g	BOX005
			1,4-Oxathiane	LT 3. -01	ug/g	BOX005
			Lead	2.94+01	ug/g	BRB005
			Dichlorodiphenylethane	LT 6. -01	ug/g	BOX005
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BOX005
			Parathion	LT 9. -01	ug/g	BOX005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BOX005
1001MKE202	4.0-4.5	Soil	Zinc	1.47+02	ug/g	BRB005
			Aldrin	LT 3. -01	ug/g	BOX006
			Arsenic	LT 2.50+00	ug/g	BOX022
			Atrazine	LT 3. -01	ug/g	BOX006
			Cadmium	LT 7.36-01	ug/g	BRB006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BOX006

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE202	4.0-4.5	Soil	Chlordane	LT 2. +00	ug/g	BOX006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX006
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOX006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX006
			Chromium	LT 6.53+00	ug/g	BR8006
			Copper	7.96+01	ug/g	BR8006
			Dibromochloropropane	LT 3. -01	ug/g	BOX006
			Dicyclopentadiene	LT 1. +00	ug/g	BOX006
			Vapona	LT 3. +00	ug/g	BOX006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOX006
			Dithiane	LT 4. -01	ug/g	BOX006
			Dieldrin	LT 3. -01	ug/g	BOX006
			Endrin	LT 5. -01	ug/g	BOX006
			Mercury	LT 5.00-02	ug/g	BR8006
			Isodrin	LT 3. -01	ug/g	BOX006
			Malathion	LT 7. -01	ug/g	BOX006
1001MKE203	4.1-5.0	Soil	1,4-Oxathiane	LT 3. -01	ug/g	BOX006
			Lead	5.18+01	ug/g	BR8006
			Dichlorodiphenylethane	LT 6. -01	ug/g	BOX006
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BOX006
			Parathion	LT 9. -01	ug/g	BOX006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BOX006
			Zinc	1.64+02	ug/g	BR8006
			Aldrin	LT 3. -01	ug/g	BOX007
			Arsenic	3.40+00	ug/g	BOX023
			Atrazine	LT 3. -01	ug/g	BOX007
			Cadmium	LT 7.36-01	ug/g	BR8007
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BOX007
			Chlordane	LT 2. +00	ug/g	BOX007
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOX007
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BOX007
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOX007

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1001MKE203	4.1-5.0	Soil	Chromium	1.77+01	ug/g	BR8007
			Copper	3.95+01	ug/g	BR8007
			Dibromochloropropane	LT 3. -01	ug/g	80X007
			Dibromopentadiene	LT 1. +00	ug/g	80X007
			Vapona	LT 3. +00	ug/g	80X007
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	80X007
			Dithiane	LT 4. -01	ug/g	80X007
			Dieldrin	3. -01	ug/g	80X007
			Endrin	LT 5. -01	ug/g	80X007
			Mercury	1.25-01	ug/g	BR8007
			Isodrin	LT 3. -01	ug/g	80X007
			Malathion	LT 7. -01	ug/g	80X007
			1,4-Oxathiane	LT 3. -01	ug/g	80X007
			Lead	5.60+01	ug/g	BR8007
1002000403	3.2-4.2	Soil	Dichlorodiphenylethane	LT 6. -01	ug/g	80X007
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	80X007
			Perathion	LT 9. -01	ug/g	80X007
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	80X007
			Zinc	7.59+02	ug/g	BR8007
			1,1,1-Trichloroethane	LT 3. -01	ug/g	8WC005
			1,1,2-Trichloroethane	LT 3. -01	ug/g	8WC005
			1,1-Dichloroethane	LT 9. -01	ug/g	8WC005
			1,2-Dichloroethane	LT 3. -01	ug/g	8WC005
			1,2-Dichloroethane	LT 3. -01	ug/g	8WC005
			m-Xylene	LT 7. -01	ug/g	8WC005
			Aldrin	2. +00	ug/g	8VZ007
			Arsenic	LT 2.50+00	ug/g	8VK021
			Atrazine	LT 3. -01	ug/g	8VZ007
			Bicycloheptadiene	LT 3. -01	ug/g	8WC005
			Benzene	LT 3. -01	ug/g	8WC005
			Carbon Tetrachloride	LT 3. -01	ug/g	8WC005
			Cadmium	LT 7.36-01	ug/g	8VV015

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	3.2-4.2	Soil	Methylene Chloride	1. +00	ug/g	BWC005
			Chloroform	LT 3. -01	ug/g	BWC005
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ007
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0016
			Chlorobenzene	LT 3. -01	ug/g	BWC005
			Chlordane	LT 2. +00	ug/g	BVZ007
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ007
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ007
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ007
			Chromium	2.08+01	ug/g	BV0015
			Copper	1.32+01	ug/g	BV0015
			Dibromochloropropane	LT 3. -01	ug/g	BVZ007
			Dibromochloropropane	LT 4. -01	ug/g	BWC005
			Dicyclopentadiene	LT 1. +00	ug/g	BVZ007
			Dicyclopentadiene	LT 3. -01	ug/g	BWC005
			Vapors	LT 3. +00	ug/g	BVZ007
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ007
			Dithiane	LT 4. -01	ug/g	BVZ007
			Dieldrin	LT 3. -01	ug/g	BVZ007
			Dimethyldisulfide	LT 8. -01	ug/g	BWC005
			Endrin	LT 5. -01	ug/g	BVZ007
			Ethylbenzene	LT 3. -01	ug/g	BWC005
			Mercury	LT 5.00-02	ug/g	BVL016
			Isodrin	LT 3. -01	ug/g	BVZ007
			Toluene	LT 3. -01	ug/g	BWC005
			Methylisobutyl Ketone	LT 3. -01	ug/g	BWC005
			Malethion	LT 7. -01	ug/g	BVZ007
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ007
			Lead	1.87+01	ug/g	BV0015
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ007
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVZ007
			Parathion	LT 9. -01	ug/g	BVZ007
			2-Chloro-1(2,4-Dichlorophenyl)	LT 6. -01	ug/g	BVZ007
			Vinylidene Phosphates			

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task II

(Chemical Sewers -- South Plants)

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	3.2-4.2	Soil	Tetrachloroethene	LT 3. -01	ug/g	BWC005
			Thiodiglycol	LT 4.20+00	ug/g	BV0016
			Trichloroethene	LT 3. -01	ug/g	BWC005
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BWC005
			Zinc	5.36+01	ug/g	BV0015
1002000403	8.2-9.2	Soil	1,1,1-Trichloroethane	LT 3. -01	ug/g	BWC006
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BWC006
			1,1-Dichloroethane	LT 9. -01	ug/g	BWC006
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC006
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC006
			m-Xylene	LT 7. -01	ug/g	BWC006
			Aldrin	LT 3. -01	ug/g	BVZ008
			Arsenic	LT 2.50+00	ug/g	BVK022
			Atrazine	LT 3. -01	ug/g	BVZ008
			Bicycloheptadiene	LT 3. -01	ug/g	BWC006
			Benzene	LT 3. -01	ug/g	BWC006
			Carbon Tetrachloride	LT 3. -01	ug/g	BWC006
			Cadmium	LT 7.36-01	ug/g	BV0016
			Methylene Chloride	LT 1. +00	ug/g	BWC006
			Chloroform	LT 3. -01	ug/g	BWC006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ008
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0017
			Chlorobenzene	LT 3. -01	ug/g	BWC006
			Chlordane	LT 2. +00	ug/g	BVZ008
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ008
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ008
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ008
			Chromium	1.16+01	ug/g	BV0016
			Copper	1.01+01	ug/g	BV0016
			Dibromochloropropane	LT 3. -01	ug/g	BVZ008
			Dibromochloropropane	LT 4. -01	ug/g	BWC006
			Dicyclopentadiene	LT 1. +00	ug/g	BVZ008
			Dicyclopentadiene	LT 3. -01	ug/g	BWC006

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 10 Chemical Sewers -- South Plants

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
10021100403	8.2-9.2	Soil	Vapors	LT 3. +00	ug/g	BVZ008
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ008
			Dithiane	LT 4. -01	ug/g	BVZ008
			Dieldrin	LT 3. -01	ug/g	BVZ008
			Dimethyldisulfide	LT 8. -01	ug/g	BWC006
			Endrin	LT 5. -01	ug/g	BVZ008
			Ethylbenzene	LT 3. -01	ug/g	BWC006
			Mercury	LT 5.00-02	ug/g	BVL017
			Isodrin	LT 3. -01	ug/g	BVZ008
			Toluene	LT 3. -01	ug/g	BWC006
			Methylisobutyl Ketone	LT 3. -01	ug/g	BWC006
			Malathion	LT 7. -01	ug/g	BVZ008
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ008
			Lead	8.38+00	ug/g	BV016
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ008
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVZ008
			Perathion	LT 9. -01	ug/g	BVZ008
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl-diethyl Phosphates	LT 6. -01	ug/g	BVZ008
			Tetrachloroethene	LT 3. -01	ug/g	BWC006
			Thiodiglycol	LT 4.20+00	ug/g	BV0017
1002000403	12.2-13.2	Soil	Trichloroethene	6. -01	ug/g	BWC006
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BWC006
			Zinc	3.68+01	ug/g	BV016
			1,1,1-Trichloroethene	LT 3. -01	ug/g	BWC007
			1,1,2-Trichloroethene	LT 3. -01	ug/g	BWC007
			1,1-Dichloroethane	LT 9. -01	ug/g	BWC007
			1,2-Dichloroethene	LT 3. -01	ug/g	BWC007
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC007
			m-Xylene	LT 7. -01	ug/g	BWC007
			Aldrin	LT 3. -01	ug/g	BVZ009
			Arsenic	LT 2.50+00	ug/g	BVK023
			Alrazine	LT 3. -01	ug/g	BVZ009

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	12.2-13.2	Soil	Bicycloheptadiene	LT 3. -01	ug/g	BWC007
			Benzene	LT 3. -01	ug/g	BWC007
			Carbon Tetrachloride	LT 3. -01	ug/g	BWC007
			Cadmium	LT 7.36-01	ug/g	BVV017
			Methylene Chloride	1. +00	ug/g	BWC007
			Chloroform	LT 3. -01	ug/g	BWC007
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ009
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0018
			Chlorobenzene	LT 3. -01	ug/g	BWC007
			Chlordane	LT 2. +00	ug/g	BVZ009
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ009
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ009
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ009
			Chromium	1.95+01	ug/g	BVV017
			Copper	1.38+01	ug/g	BVV017
			Dibromochloropropane	LT 3. -01	ug/g	BVZ009
			Dibromochloropropane	LT 4. -01	ug/g	BWC007
			Dicyclopentadiene	LT 1. +00	ug/g	BVZ009
			Dicyclopentadiene	LT 3. -01	ug/g	BWC007
			Veopona	LT 3. +00	ug/g	BVZ009
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ009
			Dithiane	LT 4. -01	ug/g	BVZ009
			Dieldrin	LT 3. -01	ug/g	BVZ009
			Dimethyldisulfide	LT 8. -01	ug/g	BWC007
			Endrin	LT 5. -01	ug/g	BVZ009
			Ethylbenzene	LT 3. -01	ug/g	BWC007
			Mercury	LT 5.00-02	ug/g	BVL018
			Isodrin	LT 3. -01	ug/g	BVZ009
			Toluene	LT 3. -01	ug/g	BWC007
			Methylisobutyl Ketone	LT 3. -01	ug/g	BWC007
			Malathion	LT 7. -01	ug/g	BVZ009
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ009
			Lead	1.57+01	ug/g	BVV017
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ009

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

List 10 Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	12.2-13.2	Soil	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVZ009
			Parathion	LT 9. -01	ug/g	BVZ009
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVZ009
			Tetrachloroethene	LT 3. -01	ug/g	BWC007
			Thiodiglycol	LT 4.20+00	ug/g	BV0018
			Trichloroethene	LT 3. -01	ug/g	BWC007
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BWC007
			Zinc	8.22+01	ug/g	BVV017
			1,1,1-Trichloroethane	LT 3. -01	ug/g	BWC008
			1,1,2-Trichloroethane	LT 3. -01	ug/g	BWC008
1002000403	17.2-18.2	Soil	1,1-Dichloroethane	LT 9. -01	ug/g	BWC008
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC008
			1,2-Dichloroethane	LT 3. -01	ug/g	BWC008
			m-Xylene	LT 7. -01	ug/g	BWC008
			Aldrin	LT 3. -01	ug/g	BVZ010
			Arsenic	LT 2.50+00	ug/g	BVK024
			Atrazine	LT 3. -01	ug/g	BVZ010
			Bicycloheptadiene	LT 3. -01	ug/g	BWC008
			Benzene	LT 3. -01	ug/g	BWC008
			Carbon Tetrachloride	LT 3. -01	ug/g	BWC008
			Cadmium	LT 7.36-01	ug/g	BVV018
			Methylene Chloride	LT 7. -01	ug/g	BWC008
			Chloroform	LT 3. -01	ug/g	BWC008
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ010
			Chloroacetic Acid	LT 3.55+01	ug/g	BV0019
			Chlorobenzene	LT 3. -01	ug/g	BWC008
			Chlordane	LT 2. +00	ug/g	BVZ010
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ010
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVZ010
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ010
			Chromium	2.09+01	ug/g	BVV018
			Copper	1.92+01	ug/g	BVV018

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	17.2-18.2	Soil	Dibromochloropropane	LT 3. -01	ug/g	BVZ010
			Dibromochloropropane	LT 4. -01	ug/g	BWC008
			Dicyclopentadiene	LT 1. +00	ug/g	BVZ010
			Dicyclopentadiene	LT 3. -01	ug/g	BWC008
			Vapona	LT 3. +00	ug/g	BVZ010
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ010
			Dithiane	LT 4. -01	ug/g	BVZ010
			Dieldrin	LT 3. -01	ug/g	BVZ010
			Dimethyldisulfide	LT 8. -01	ug/g	BWC008
			Endrin	LT 5. -01	ug/g	BVZ010
			Ethylbenzene	LT 3. -01	ug/g	BWC008
			Mercury	LT 5.00-02	ug/g	BVL019
			Isodrin	LT 3. -01	ug/g	BVZ010
			Toluene	LT 3. -01	ug/g	BWC008
			Methylisobutyl Ketone	LT 3. -01	ug/g	BWC008
			Malathion	LT 7. -01	ug/g	BVZ010
			1,4-Oxathiane	LT 3. -01	ug/g	BVZ010
			Lead	1.41+01	ug/g	BVZ018
			Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ010
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVZ010
1002000403	22.2-23.2	Soil	Parathion	LT 9. -01	ug/g	BVZ010
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6. -01	ug/g	BVZ010
			Tetrachloroethene	LT 3. -01	ug/g	BWC008
			Trindiglycol	LT 4.20+00	ug/g	BVZ019
			Trichloroethene	LT 3. -01	ug/g	BWC008
			Ortho- & Para-Xylene	LT 3. -01	ug/g	BWC008
			Zinc	7.22+01	ug/g	BVZ018
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BWD002
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BWD002
			1,1-Dichloroethane	LT 2. +00	ug/g	BWC002
			1,2-Dichloroethane	LT 2. +00	ug/g	BWC002
			1,2-Dichloroethane	LT 6. -01	ug/g	BWD002

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Phasco Services Incorporated

Task 10 Chemical Sewers - South Plants

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	22.2-23.2	Soil	m-Xylene	LT 8. -01	ug/g	BWD002
			Aldrin	LT 3. -01	ug/g	BWA002
			Arsenic	LT 2.50+00	ug/g	BWF005
			Atrazine	LT 3. -01	ug/g	BWA002
			Bicycloheptadiene	LT 4. -01	ug/g	BWD002
			Benzene	LT 3. -01	ug/g	BWD002
			Carbon Tetrachloride	LT 3. -01	ug/g	BWD002
			Cadmium	LT 7.36-01	ug/g	BVVD19
			Methylene Chloride	LT 2. +00	ug/g	BWD002
			Chloroform	LT 3. -01	ug/g	BWD002
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BWA002
			Chloroacetic Acid	LT 3.55+01	ug/g	BVVD20
			Chlorobenzene	LT 1. +00	ug/g	BWD002
			Chlordane	LT 2. +00	ug/g	BWA002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BWA002
			p-Chlorophenylmethyl Sulfonide	LT 3. -01	ug/g	BWA002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BWA002
			Chromium	LT 6.53+00	ug/g	BVVD19
			Copper	LT 1.87+01	ug/g	BVVD19
			Dibromochloropropane	LT 3. -01	ug/g	BWA002
			Dibromochloropropane	LT 2. +00	ug/g	BWD002
			Dibromochloropropane	LT 1. +00	ug/g	BWA002
			Dicyclopentadiene	LT 7. -01	ug/g	BWD002
			Dicyclopentadiene	LT 3. +00	ug/g	BWA002
			Vapona	LT 1. +00	ug/g	BWA002
			Diisopropylmethyl Phosphonate	LT 4. -01	ug/g	BWA002
			Dithiane	LT 3. -01	ug/g	BWA002
			Dieldrin	LT 2. +01	ug/g	BWD002
			Dimethyldisulfide	LT 5. -01	ug/g	BWA002
			Endrin	LT 4. -01	ug/g	BWD002
			Ethylbenzene	LT 5.00-02	ug/g	BVL020
			Mercury	LT 3. -01	ug/g	BWA002
			Isodrin	LT 3. -01	ug/g	BWF002
			Toluene	LT 7. -01	ug/g	BWD002
			Methylisobutyl Ketone			

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000403	22.2-23.2	Soil	Malathion	LT 7. -01	ug/g	BWAD002
			1,4-Oxathiane	LT 3. -01	ug/g	BWAD002
			Lead	LT 2.02+01	ug/g	BVVD019
			Dichlorodiphenylethane	LT 6. -01	ug/g	BWAD002
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BWAD002
			Parathion	LT 9. -01	ug/g	BWAD002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BWAD002
			Tetrachloroethene	LT 3. -01	ug/g	BWAD002
			Thiodiglycol	LT 4.20+01	ug/g	BVVD020
			Trichloroethene	LT 5. -01	ug/g	BWAD002
1002000601	12.5-13.5	Soil	Ortho- & Para-Xylene	LT 5. +00	ug/g	BWAD002
			Zinc	LT 7.30+01	ug/g	BVVD019
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BVVD004
			1,1,2-Trichloroethane	LT 4. -01	ug/g	BVVD004
			1,1-Dichloroethane	LT 2. +00	ug/g	BVVD004
			1,2-Dichloroethane	LT 2. +00	ug/g	BVVD004
			1,2-Dichloroethane	LT 6. -01	ug/g	BVVD004
			m-Xylene	LT 8. -01	ug/g	BVVD004
			Aldrin	LT 3. -01	ug/g	BWAD014
			Arsenic	LT 5.0 +00	ug/g	BVVD021
			Atrazine	LT 3. -01	ug/g	BWAD014
			Bicycloheptadiene	LT 4. -01	ug/g	BVVD004
			Benzene	LT 3. -01	ug/g	BVVD004
			Carbon Tetrachloride	LT 3. -01	ug/g	BVVD004
			Cadmium	LT 7.36-01	ug/g	BVVD010
			Methylene Chloride	LT 2. +00	ug/g	BVVD004
			Chloroform	LT 3. -01	ug/g	BVVD004
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BWAD014
			Chlorobenzene	LT 1. +00	ug/g	BVVD004
			Chloroform	LT 6. -01	ug/g	BWAD014
			p-Chlorophenylmethyl sulfide	LT 4. +00	ug/g	BWAD014
			p-Chlorophenylmethyl sulfoxide	LT 7. +00	ug/g	BWAD014

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Fluoro Services Incorporated

Chemical Sewers -- South Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000601	12.5-13.5	Soil	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BUW014
			Chromium	LT 6.53+00	ug/g	BVJ010
			Copper	4.65+01	ug/g	BVJ010
			Dibromochloropropane	LT 2. +00	ug/g	BUV004
			Dibromochloropropane	LT 3. -01	ug/g	BUW014
			Dicyclopentadiene	LT 7. -01	ug/g	BUV004
			Dicyclopentadiene	LT 4. -01	ug/g	BUW014
			Vapona	LT 3. -01	ug/g	BUW014
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BUW014
			Dithiane	LT 7. +00	ug/g	BUW014
			Dieldrin	LT 3. -01	ug/g	BUW014
			Dimethyldisulfide	LT 2. +01	ug/g	BUV004
			Endrin	LT 3. -01	ug/g	BUW014
			Ethylbenzene	LT 4. -01	ug/g	BUV004
			Mercury	LT 5.00-02	ug/g	BVD011
			Isodrin	LT 3. -01	ug/g	BUW014
			Toluene	LT 3. -01	ug/g	BUV004
			Methylisobutyl Ketone	LT 7. -01	ug/g	BUV004
			Malathion	LT 3. -01	ug/g	BUW014
			1,4-Oxathiane	LT 6. +00	ug/g	BUW014
1002000601	17.5-18.5	Soil	Lead	3.62+01	ug/g	BVJ010
			Dichlorodiphenylethane	LT 3. -01	ug/g	BUW014
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	BUW014
			Parathion	LT 4. -01	ug/g	BUW014
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	BUW014
			Tetrachloroethene	LT 3. -01	ug/g	BUV004
			Thiodiglycol	LT 2.55+00	ug/g	BVG003
			Trichloroethene	LT 5. -01	ug/g	BUV004
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BUV004
			Zinc	8.53+01	ug/g	BVJ010
			1,1,1-Trichloroethane	LT 4. -01	ug/g	BUV005

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000601	17.5-18.5	Soil	1,1,2-Trichloroethane	8.1 -01	ug/g	BUV005
			1,1-Dichloroethane	LT 2. +00	ug/g	BUV005
			1,2-Dichloroethane	LT 2. +00	ug/g	BUV005
			1,2-Dichloroethane	LT 6. -01	ug/g	BUV005
			m-Xylene	LT 8. -01	ug/g	BUV005
			Aldrin	LT 3. -01	ug/g	BUW015
			Arsenic	LT 5.0 +00	ug/g	BVC022
			Atrazine	LT 3. -01	ug/g	BUW015
			Bicycloheptadiene	LT 4. -01	ug/g	BUV005
			Benzene	LT 3. -01	ug/g	BUV005
			Carbon Tetrachloride	LT 3. -01	ug/g	BUV005
			Cadmium	LT 7.36-01	ug/g	BVJ011
			Methylene Chloride	LT 2. +00	ug/g	BUV005
			Chloroform	LT 3. -01	ug/g	BUV005
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BUW015
			Chlorobenzene	LT 1. +00	ug/g	BUV005
			Chlordane	LT 6. -01	ug/g	BUW015
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BUW015
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BUW015
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BUW015
			Chromium	LT 6.53+00	ug/g	BVJ011
			Copper	4.24+01	ug/g	BVJ011
			Dibromochloropropane	LT 2. +00	ug/g	BUV005
			Dibromochloropropane	LT 3. -01	ug/g	BUW015
			Dicyclopentadiene	LT 7. -01	ug/g	BUV005
			Dicyclopentadiene	LT 4. -01	ug/g	BUW015
			Vapona	LT 3. -01	ug/g	BUW015
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BUW015
			Dithiane	LT 7. +00	ug/g	BUW015
			Dieldrin	LT 3. -01	ug/g	BUW015
			Dimethyldisulfide	LT 2. +01	ug/g	BUV005
			Endrin	LT 3. -01	ug/g	BUW015
			Ethylbenzene	LT 4. -01	ug/g	BUV005
			Mercury	LT 5.00-02	ug/g	BV0012

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task III

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000601	17.5-18.5	Soil	Isodrin	LT 3. -01	ug/g	BUW015
			Toluene	LT 3. -01	ug/g	BUV005
			Methylisobutyl Ketone	LT 7. -01	ug/g	BUV005
			Malathion	LT 3. -01	ug/g	BUW015
			1,4-Oxathione	LT 6. +00	ug/g	BUW015
			Lead	1.23+01	ug/g	BVJ011
			Dichlorodiphenylethane	LT 3. -01	ug/g	BUW015
			Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	BUW015
			Parathion	LT 4. -01	ug/g	BUW015
			2-Chloro-1(2,4-Dichlorophenyl) Vinyllethyl Phosphates	LT 3. -01	ug/g	BUW015
			Tetrachloroethene	LT 3. -01	ug/g	BUV005
			Thiodiglycol	LT 2.55+00	ug/g	B8G004
			Trichloroethene	LT 5. -01	ug/g	BUV005
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BUV005
			Zinc	1.05+02	ug/g	BVJ011
1002000601	23.5-24.5	Soil	1,1,1-Trichloroethene	4.6 -01	ug/g	BUV006
			1,1,2-Trichloroethene	LT 4. -01	ug/g	BUV006
			1,1-Dichloroethene	LT 2. +00	ug/g	BUV006
			1,2-Dichloroethene	LT 2. +00	ug/g	BUV006
			1,2-Dichloroethane	LT 6. -01	ug/g	BUV006
			m-Xylene	LT 8. -01	ug/g	BUV006
			Aldrin	LT 3. -01	ug/g	BUX002
			Arsenic	LT 5.0 +00	ug/g	BVC023
			Atrazine	LT 3. -01	ug/g	BUX002
			Bicycloheptadiene	LT 4. -01	ug/g	BUV006
			Benzene	LT 3. -01	ug/g	BUV006
			Carbon Tetrachloride	5.8 -01	ug/g	BUV006
			Cadmium	LT 7.36-01	ug/g	BVJ012
			Methylene Chloride	LT 2. +00	ug/g	BUV006
			Chloroform	LT 3. -01	ug/g	BUV006
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BUX002

Note: Results for some parameters may appear in more than one analytical fraction.

Flasco Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- South Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000601	23.5-24.5	Soil	Chlorobenzene	LT 1. +00	ug/g	BUX006
			Chlordane	LT 2. +00	ug/g	BUX002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BUX002
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BUX002
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BUX002
			Chromium	LT 6.53+00	ug/g	BVJ012
			Copper	4.62+01	ug/g	BVJ012
			Dibromochloropropane	LT 2. +00	ug/g	BUX006
			Dibromochloropropane	LT 3. -01	ug/g	BUX002
			Dicyclopentadiene	LT 7. -01	ug/g	BUX006
			Dicyclopentadiene	LT 1. +00	ug/g	BUX002
			Vapona	LT 3. +00	ug/g	BUX002
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BUX002
			Dithiane	LT 4. -01	ug/g	BUX002
			Dieldrin	LT 3. -01	ug/g	BUX002
			Dimethyldisulfide	LT 2. +01	ug/g	BUX006
			Endrin	LT 5. -01	ug/g	BUX002
			Ethylbenzene	LT 4. -01	ug/g	BUX006
			Mercury	LT 5.00-02	ug/g	BVD013
			Isodrin	LT 3. -01	ug/g	BUX002
			Toluene	LT 3. -01	ug/g	BUX006
			Methylisobutyl Ketone	LT 7. -01	ug/g	BUX006
			Malathion	LT 7. -01	ug/g	BUX002
			1,4-Oxathiane	LT 3. -01	ug/g	BUX002
			Lead	1.94+01	ug/g	BVJ012
			Dichlorodiphenylethane	LT 6. -01	ug/g	BUX002
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BUX002
			Parathion	LT 9. -01	ug/g	BUX002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BUX002
			Tetrachloroethene	1.0 +00	ug/g	BUX006
			Thiodialcyl	LT 2.55+00	ug/g	BVG005
			Trichloroethene	LT 5. -01	ug/g	BUX006

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Task 10 (Chemical Sewers -- South Plants)

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002000601	29-30	Soil	Dimethyldisulfide	LT 2. +01	ug/g	BUV007
			Endrin	LT 5. -01	ug/g	BUX003
			Ethylbenzene	LT 4. -01	ug/g	BUV007
			Mercury	LT 5.00-02	ug/g	BUV014
			Isodrin	LT 3. -01	ug/g	BUX003
			Toluene	LT 3. -01	ug/g	BUV007
			Methylisobutyl Ketone	LT 7. -01	ug/g	BUV007
			Malathion	LT 7. -01	ug/g	BUX003
			1,4-Oxathiane	LT 3. -01	ug/g	BUX003
			Lead	LT 2.84+01	ug/g	BUJ013
			Dichlorodiphenylethane	LT 6. -01	ug/g	BUX003
			Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BUX003
			Parathion	LT 9. -01	ug/g	BUX003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BUX003
10020006211	8-9	Soil	Tetrachloroethene	LT 3. -01	ug/g	BUV007
			Thiodiglycol	LT 2.55+00	ug/g	88G006
			Trichloroethene	LT 5. -01	ug/g	BUV007
			Ortho- & Para-Xylene	LT 5. +00	ug/g	BUV007
			Zinc	LT 7.98+01	ug/g	BUJ013
			Aldrin	LT 3. -01	ug/g	BOY002
			Arsenic	LT 2.50+00	ug/g	BOY002
			Atrazine	LT 3. -01	ug/g	BOY002
			Cadmium	LT 7.36-01	ug/g	BRB008
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	BOY002
			Chlordane	LT 6. -01	ug/g	BOY002
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BOY002
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BOY002
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BOY002
			Chromium	LT 1.25+01	ug/g	BRB008
			Copper	LT 1.89+01	ug/g	BRB008
			Dibromochloropropane	LT 3. -01	ug/g	BOY002
			Dichloropentadiene	LT 4. -01	ug/g	BOY002

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Fluoro Services Incorporated

Task 10 Chemical Sewers -- South Plants

Summary of Analytical Results

Boxing Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002MKE211	8-9	Soil	Vapona	LT 3. -01	ug/g	80Y002
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	80Y002
			Dithiane	LT 7. +00	ug/g	80Y002
			Dieldrin	LT 3. -01	ug/g	80Y002
			Endrin	LT 3. -01	ug/g	80Y002
			Mercury	LT 5.00-02	ug/g	BRA008
			Isodrin	LT 3. -01	ug/g	80Y002
			Malathion	LT 3. -01	ug/g	80Y002
			1,4-Oxathiane	LT 6. +00	ug/g	80Y002
			Lead	LT 2.84+01	ug/g	BR8008
			Dichlorodiphenylethane	LT 3. -01	ug/g	80Y002
			Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	80Y002
			Parathion	LT 4. -01	ug/g	80Y002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	80Y002
1002MKE212	7.8-9.0	Soil	Zinc	LT 6.82+01	ug/g	BR8008
			Aldrin	LT 3. -01	ug/g	80Y003
			Arsenic	LT 2.50+00	ug/g	BR0005
			Atrazine	LT 3. -01	ug/g	80Y003
			Cadmium	LT 7.36-01	ug/g	BR8009
			Hexachlorocyclopentadiene	LT 3. -01	ug/g	80Y003
			Chlordane	LT 6. -01	ug/g	80Y003
			p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	80Y003
			p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	80Y003
			p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	80Y003
			Chromium	LT 1.39+01	ug/g	BR8009
			Copper	LT 1.69+01	ug/g	BR8009
			Dibromochloropropane	LT 3. -01	ug/g	80Y003
			Dicyclopentadiene	LT 4. -01	ug/g	80Y003
			Vapona	LT 3. -01	ug/g	80Y003
			Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	80Y003
			Dithiane	LT 7. +00	ug/g	80Y003

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1002MKF.212	7.8-9.0	Soil	Dieldrin	LT 3. -01	ug/g	80Y003
			Endrin	LT 3. -01	ug/g	80Y003
			Mercury	LT 5.00-02	ug/g	BR0009
			Isodrin	LT 3. -01	ug/g	80Y003
			Malathion	LT 3. -01	ug/g	80Y003
			1,4-Oxathiane	LT 6. +00	ug/g	80Y003
			Lead	LT 1.80+01	ug/g	BR0009
			Dichlorodiphenylethane	LT 3. -01	ug/g	80Y003
			Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	80Y003
			Parathion	LT 4. -01	ug/g	80Y003
			2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	80Y003
			Zinc	5.83+01	ug/g	BR0009

Note: Results for some parameters may appear in more than one analytical fraction.

Erason Services Incorporated
Summary of Analytical Results

Task 10 Rocky Mountain Arsenal Program
Chemical Sewers -- North Plants

01/27/88

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MKE111	4.4-5.6	Soil	Aldrin	LT 3. -01	ug/g	BR0002
			Arsenic	LT 2.50+00	ug/g	BRU013
			Atrazine	LT 3. -01	ug/g	BR0002
			Cadmium	LT 7.36-01	ug/g	BR1012
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	ER0002
			Chlordane	LT 2. +00	ug/g	BR0002
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BR0002
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BR0002
			p-Chlorophenylmethyl Sulfone	LT 3. 01	ug/g	BR0002
			Chromium	1.21+01	ug/g	BR1012
			Copper	1.41+01	ug/g	BR1012
			Dibromochloropropane	LT 3. -01	ug/g	BR0002
			Dicyclopentadiene	LT 1. +00	ug/g	BR0002
			Vapona	LT 3. +00	ug/g	BR0002
			Diisopropylmethyl Phosphonate	1. +00	ug/g	BR0002
			Dithiane	LT 4. -01	ug/g	BR0002
			Dieldrin	LT 3. -01	ug/g	BR0002
			Endrin	LT 5. -01	ug/g	BR0002
			Mercury	2.46-01	ug/g	BRJ016
			Isodrin	LT 3. -01	ug/g	BR0002
1036MKE112	5.2 6.1	Soil	Malathion	LT 7. -01	ug/g	BR0002
			1,4-Oxathiane	LT 3. -01	ug/g	BR0002
			Lead	LT 8.38+00	ug/g	BR1012
			Dichlorodiphenylethane	LT 6. -01	ug/g	BR0002
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BR0002
			Parathion	LT 9. -01	ug/g	BR0002
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BR0002
			Zinc	5.53+01	ug/g	BR1012
			Aldrin	LT 3. -01	ug/g	BR0003
			Arsenic	LT 2.50+00	ug/g	BRU014
			Atrazine	LT 3. -01	ug/g	BR0003
			Cadmium	LT 7.36-01	ug/g	BR1013

Note: Results for some parameters may appear in more than one analytical fraction.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Task 10 Chemical Sewers -- North Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MKE112	5.2-6.1	Soil	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BR0003
			Chlordane	LT 2. +00	ug/g	BR0003
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BR0003
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BR0003
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BR0003
			Chromium	1.28+01	ug/g	BR1013
			Copper	7.90+00	ug/g	BR1013
			Dibromochloropropane	LT 3. -01	ug/g	BR0003
			Dicyclopentadiene	LT 1. +00	ug/g	BR0003
			Vapone	LT 3. +00	ug/g	BR0003
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BR0003
			Dithiane	LT 4. -01	ug/g	BR0003
			Dieldrin	LT 3. -01	ug/g	BR0003
			Endrin	LT 5. -01	ug/g	BR0003
			Mercury	6.29-01	ug/g	BRJ017
			Isodrin	LT 3. -01	ug/g	BR0003
			Malathion	LT 7. -01	ug/g	BR0003
			1,4-Oxathiane	LT 3. -01	ug/g	BR0003
			Lead	1.51+01	ug/g	BR1013
			Dichlorodiphenylethane	LT 6. -01	ug/g	BR0003
1036MKE113	4.9-5.8	Soil	Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BR0003
			Parathion	LT 9. -01	ug/g	BR0003
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BR0003
			Zinc	5.32+01	ug/g	BR1013
			Aldrin	LT 3. -01	ug/g	BR0004
			Arsenic	LT 2.50+00	ug/g	BRU015
			Atrazine	LT 3. -01	ug/g	BR0004
			Cadmium	LT 7.36-01	ug/g	BR1014
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BR0004
			Chlordane	LT 2. +00	ug/g	BR0004
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BR0004
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BR0004

Note: Results for some parameters may appear in more than one analytical fraction.

Summary of Analytical Results

Task 10

Chemical Sewers -- North Plants

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MKE113	4.9-5.8	Soil	Chromium	1.57+01	ug/g	BR1014
			Copper	1.06+01	ug/g	BR1014
			Dibromochloropropane	LT 3. -01	ug/g	BR0004
			Dicyclopentadiene	LT 1. +00	ug/g	BR0004
			Vapona	LT 3. +00	ug/g	BR0004
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BR0004
			Dithiane	LT 4. -01	ug/g	BR0004
			Dieldrin	LT 3. -01	ug/g	BR0004
			Endrin	LT 5. -01	ug/g	BR0004
			Mercury	5.75-02	ug/g	BRJ018
			Isodrin	LT 3. -01	ug/g	BR0004
			Malethion	LT 7. -01	ug/g	BR0004
			1,4-Oxethiane	LT 3. -01	ug/g	BR0004
			Lead	LT 8.38+00	ug/g	BR1014
			Dichlorodiphenylethane	LT 6. -01	ug/g	BR0004
1036MKE221	5.2-6.1	Soil	Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BR0004
			Parathion	LT 9. -01	ug/g	BR0004
			2-Chloro-1(2,4-Dichlorophenyl) Vinyllethyl Phosphates	LT 6. -01	ug/g	BR0004
			Zinc	5.45+01	ug/g	BR1014
			Aldrin	LT 3. -01	ug/g	BR0005
			Arsenic	LT 2.50+00	ug/g	BRU018
			Atrazine	LT 3. -01	ug/g	BR0005
			Cadmium	LT 6.6 -01	ug/g	BRK007
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BR0005
			Chlordane	LT 2. +00	ug/g	BR0005
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BR0005
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BR0005
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BR0005
			Chromium	8.4 +00	ug/g	BRK007
			Copper	LT 4.9 +00	ug/g	BRK007
			Dibromochloropropane	LT 3. -01	ug/g	BR0005
			Dicyclopentadiene	LT 1. +00	ug/g	BRU005

Note: Results for some parameters may appear in more than one analytical fraction.

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MKE221	5.2-6.1	Soil	Vapors	LT 3. +00	ug/g	BRD005
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD005
			Dithiane	LT 4. -01	ug/g	BRD005
			Dieldrin	LT 3. -01	ug/g	BRD005
			Endrin	LT 5. -01	ug/g	BRD005
			Mercury	LT 5.00-02	ug/g	BRJ013
			Isodrin	LT 3. -01	ug/g	BRJ005
			Methion	LT 7. -01	ug/g	BRJ005
			1,4-Dioxathiane	LT 3. -01	ug/g	BRD005
			Lead	7.2 +00	ug/g	BRK007
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRD005
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRD005
			Parathion	LT 9. -01	ug/g	BRD005
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD005
1036MKE222	5.3-6.0	Soil	Zinc	3.6 +01	ug/g	BRK007
			Aldrin	LT 3. -01	ug/g	BRD006
			Arsenic	LT 2.50+00	ug/g	BRD019
			Atrazine	LT 3. -01	ug/g	BRD006
			Cadmium	1.3 +00	ug/g	BRK008
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD006
			Chlordane	LT 2. +00	ug/g	BRD006
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD006
			p-Chlorophenylmethyl Sulfonide	LT 3. -01	ug/g	BRD006
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD006
			Chromium	1.0 +01	ug/g	BRK008
			Copper	LT 4.9 +00	ug/g	BRK008
			Dibromochloropropane	LT 3. -01	ug/g	BRD006
			Dicyclopentadiene	LT 1. +00	ug/g	BRD006
			Vapors	LT 3. +00	ug/g	BRD006
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD006
			Dithiane	LT 4. -01	ug/g	BRD006

Note: Results for some parameters may appear in more than one analytical fraction.

Enviro Services Incorporated

Rocky Mountain Arsenal Program

01/27/88

Summary of Analytical Results

Task 10

Chemical Sewers -- North Plants

Boxing Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MHE222	5.3-6.0	Soil	Dieldrin	LT 3. -01	ug/g	BRD006
			Endrin	LT 5. -01	ug/g	BRD006
			Mercury	2.60-01	ug/g	BRJ014
			Isodrin	LT 3. -01	ug/g	BRD006
			Malathion	LT 7. -01	ug/g	BRD006
			1,4-Oxathiane	LT 3. -01	ug/g	BRD006
			Lead	1.8 +01	ug/g	BRK008
			Dichlorodiphenylethane	LT 6. -01	ug/g	BRD006
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BRD006
			Parathion	LT 9. -01	ug/g	BRD006
			2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD006
			Zinc	6.8 +01	ug/g	BRK008
1036MHE223	5.9-6.7	Soil	Aldrin	LT 3. -01	ug/g	BRD007
			Arsenic	LT 2.50+00	ug/g	BRU020
			Atrazine	LT 3. -01	ug/g	BRD007
			Cadmium	LT 6.6 -01	ug/g	BRK009
			Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD007
			Chlordane	LT 2. +00	ug/g	BRD007
			p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD007
			p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRD007
			p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD007
			Chromium	1.2 +01	ug/g	BRK009
			Copper	7.5 +00	ug/g	BRK009
			Dibromochloropropane	LT 3. -01	ug/g	BRD007
			Dicyclopentadiene	LT 1. +00	ug/g	BRD007
			Vapona	LT 3. +00	ug/g	BRD007
			Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRU007
			Dithiane	LT 4. -01	ug/g	BRD007
			Dieldrin	LT 3. -01	ug/g	BRD007
			Endrin	LT 5. -01	ug/g	BRD007
			Mercury	LT 5.00-02	ug/g	BRJ015
			Isodrin	LT 3. -01	ug/g	BRU007

Note: Results for some parameters may appear in more than one analytical fraction.

01/27/88

Rocky Mountain Arsenal Program

Ebasco Services Incorporated

Chemical Sewers -- North Plants

Task 10

Summary of Analytical Results

Boring Number	Depth (ft)	Sample Type	Analytical Parameters	Results	Units	Sample Number
1036MKE223	5.9-6.7	Soil	Malathion	LT 7. -01	ug/g	BR0007
			1,4-Oxathiane	LT 3. -01	ug/g	BR0007
			Lead	LT 1.3 +01	ug/g	BRK009
			Dichlorodiphenylethane	LT 6. -01	ug/g	BR0007
			Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BR0007
			Parathion	LT 9. -01	ug/g	BR0007
			2-Chloro-1(2,4-Dichlorophenyl)	LT 6. -01	ug/g	BR0007
			Vinylidethyl Phosphates	4.4 +01	ug/g	BRK009
			Zinc			

Note: Results for some parameters may appear in more than one analytical fraction.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Thiodiglycol	LT 2.55+01	ug/g	BBG011
Blank	Thiodiglycol	LT 2.55+00	ug/g	BB1006
Blank	Mercury	8.60-02	ug/g	BO5001
Blank	Arsenic	3.43+00	ug/g	BO7001
Blank	Cadmium	LT 6.6 -01	ug/g	BOJ001
Blank	Chromium	LT 5.2 +00	ug/g	BOJ001
Blank	Copper	LT 4.9 +00	ug/g	BOJ001
Blank	Lead	LT 1.3 +01	ug/g	BOJ001
Blank	Zinc	LT 9.5 +00	ug/g	BOJ001
Blank	Dibromochloropropane	LT 5.00-03	ug/g	BOV001
Blank	Aldrin	LT 3. -01	ug/g	BOW001
Blank	Atrazine	LT 3. -01	ug/g	BOW001
Blank	Chlordane	LT 2. +00	ug/g	BOW001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BOW001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BOW001
Blank	p-Chlorophenylmethyl Sulfonide	LT 3. -01	ug/g	BOW001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BOW001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BOW001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BOW001
Blank	Vapone	LT 3. +00	ug/g	BOW001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BOW001
Blank	Dithiane	LT 4. -01	ug/g	BOW001
Blank	Dieldrin	LT 3. -01	ug/g	BOW001
Blank	Endrin	LT 5. -01	ug/g	BOW001
Blank	Isodrin	LT 3. -01	ug/g	BOW001
Blank	Malathion	LT 7. -01	ug/g	BOW001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BOW001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BOW001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BOW001
Blank	Parathion	LT 9. -01	ug/g	BOW001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BOW001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BOX001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Thesco Services, Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dicyclopentadiene	LT 1. +00	ug/g	80X001
Blank	Dithiane	LT 4. -01	ug/g	80X001
Blank	Disopropylmethyl Phosphonate	LT 1. +00	ug/g	80X001
Blank	Dibromochloropropane	LT 3. -01	ug/g	80X001
Blank	Vapona	LT 3. +00	ug/g	80X001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	80X001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	80X001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	80X001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	80X001
Blank	Atrazine	LT 3. -01	ug/g	80X001
Blank	Malathion	LT 7. -01	ug/g	80X001
Blank	Aldrin	LT 3. -01	ug/g	80X001
Blank	Parathion	LT 9. -01	ug/g	80X001
Blank	Isodrin	LT 3. -01	ug/g	80X001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6. -01	ug/g	80X001
Blank	Chlordane	LT 2. +00	ug/g	80X001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	80X001
Blank	Dieldrin	LT 3. -01	ug/g	80X001
Blank	Endrin	LT 5. -01	ug/g	80X001
Blank	Dichlorodiphenyltrichloro- ethane	LT 5. -01	ug/g	80X001
Blank	Aldrin	LT 3. -01	ug/g	80Y001
Blank	Atrazine	LT 3. -01	ug/g	80Y001
Blank	Chlordane	LT 6. -01	ug/g	80Y001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	80Y001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	80Y001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	80Y001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	80Y001
Blank	Dibromochloropropane	LT 3. -01	ug/g	80Y001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	80Y001
Blank	Vapona	LT 3. -01	ug/g	80Y001
Blank	Disopropylmethyl Phosphonate	LT 3. -01	ug/g	80Y001
Blank	Dithiane	LT 7. +00	ug/g	80Y001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Fluoroc Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
(Chemical Sewers -- South Plants)

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dieldrin	LT 3. -01	ug/g	BOY001
Blank	Endrin	LT 3. -01	ug/g	BOY001
Blank	Isodrin	LT 3. -01	ug/g	BOY001
Blank	Malathion	LT 3. -01	ug/g	BOY001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	BOY001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	BOY001
Blank	Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	BOY001
Blank	Parathion	LT 4. -01	ug/g	BOY001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BOY001
Blank	Mercury	8.30-02	ug/g	BRAD01
Blank	Cadmium	LT 7.36-01	ug/g	BRB001
Blank	Chromium	1.77+01	ug/g	BRB001
Blank	Copper	8.44+00	ug/g	BRB001
Blank	Lead	1.31+01	ug/g	BRB001
Blank	Zinc	4.40+01	ug/g	BRB001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BRB001
Blank	Aldrin	LT 3. -01	ug/g	BRB001
Blank	Atrezine	LT 3. -01	ug/g	BRB001
Blank	Chlordane	LT 2. +00	ug/g	BRB001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRB001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRB001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRB001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRB001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BRB001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BRB001
Blank	Vapor	LT 3. +00	ug/g	BRB001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRB001
Blank	Dithiane	LT 4. -01	ug/g	BRB001
Blank	Dieldrin	LT 3. -01	ug/g	BRB001
Blank	Endrin	LT 5. -01	ug/g	BRB001
Blank	Isodrin	LT 3. -01	ug/g	BRB001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Porty Mountain Arsenal Program
Blanks Associated with Task in
Chemical Sewers -- South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Melathion	LT 7. -01	ug/g	BRD001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BRD001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BRD001
Blank	Parathion	LT 9. -01	ug/g	BRD001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD001
Blank	Aldrin	LT 3. -01	ug/g	BRD001
Blank	Atrazine	LT 3. -01	ug/g	BRD001
Blank	Chlordane	LT 2. +00	ug/g	BRD001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BRD001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BRD001
Blank	Vapone	LT 3. +00	ug/g	BRD001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD001
Blank	Dithiane	LT 4. -01	ug/g	BRD001
Blank	Dieldrin	LT 3. -01	ug/g	BRD001
Blank	Endrin	LT 5. -01	ug/g	BRD001
Blank	Isodrin	LT 3. -01	ug/g	BRD001
Blank	Melathion	LT 7. -01	ug/g	BRD001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BRD001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BRD001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BRD001
Blank	Parathion	LT 9. -01	ug/g	BRD001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD001
Blank	Dibromochloropropane	LT 5.00-03	ug/g	BRD001
Blank	Arsenic	LT 5.0 +00	ug/g	BRD001
Blank	Calcium	LT 7.36-01	ug/g	BRD001
Blank	Chromium	LT 1.01+01	ug/g	BRD001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
(Chemical Sewers - South Plants)

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Copper	1.07+01	ug/g	BR1001
Blank	Lead	1.15+01	ug/g	BR1001
Blank	Zinc	3.56+01	ug/g	BR1001
Blank	Mercury	1.10-01	ug/g	BRJ001
Blank	Chromium	LT 5.2 +00	ug/g	BRK001
Blank	Copper	LT 4.9 +00	ug/g	BRK001
Blank	Lead	LT 1.3 +01	ug/g	BRK001
Blank	Zinc	LT 9.5 +00	ug/g	BRK001
Blank	Mercury	1.26-01	ug/g	BRL001
Blank	Arsenic	2.70+00	ug/g	BRU001
Blank	Bicycloheptadiene	LT 4. -01	ug/g	BUV001
Blank	Carbon tetrachloride	LT 3. -01	ug/g	BUV001
Blank	Chlorobenzene	LT 1. +00	ug/g	BUV001
Blank	Benzene	LT 3. -01	ug/g	BUV001
Blank	Dibromochloropropane	LT 2. +00	ug/g	BUV001
Blank	Dicyclopentadiene	LT 7. -01	ug/g	BUV001
Blank	Dimethyldisulfide	LT 2. +01	ug/g	BUV001
Blank	Ethylbenzene	LT 4. -01	ug/g	BUV001
Blank	Toluene	LT 3. -01	ug/g	BUV001
Blank	Methylisobutyl Ketone	LT 7. -01	ug/g	BUV001
Blank	Ortho- & Para-Xylene	LT 5. +00	ug/g	BUV001
Blank	1,1-Dichloroethane	LT 2. +00	ug/g	BUV001
Blank	1,1,1-Trichloroethane	LT 4. -01	ug/g	BUV001
Blank	1,1,2-Trichloroethane	LT 4. -01	ug/g	BUV001
Blank	1,2-Dichloroethane	LT 2. +00	ug/g	BUV001
Blank	1,2-Dichloroethane	LT 6. -01	ug/g	BUV001
Blank	m-Xylene	LT 8. -01	ug/g	BUV001
Blank	Chloroform	1.3 +00	ug/g	BUV001
Blank	Methylene Chloride	4.9 +00	ug/g	BUV001
Blank	Tetrachloroethane	3.7 -01	ug/g	BUV001
Blank	Trichloroethane	2.5 +00	ug/g	BUV001
Blank	Tetrachloroethane	3.7 -01	ug/g	BUV001
Blank	Methylene Chloride	4.9 +00	ug/g	BUV001
Blank	Chloroform	1.3 +00	ug/g	BUV001

Note: Blanks are matched to analytical data by the first three characters in the Sample Number.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BUW001
Blank	Aldrin	LT 3. -01	ug/g	BUW001
Blank	Atrazine	LT 3. -01	ug/g	BUW001
Blank	Chlordane	LT 6. -01	ug/g	BUW001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	BUW001
Blank	p-Chlorophenylmethyl Sulfonate	LT 7. +00	ug/g	BUW001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BUW001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BUW001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	BUW001
Blank	Vapona	LT 3. -01	ug/g	BUW001
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BUW001
Blank	Dithiane	LT 7. +00	ug/g	BUW001
Blank	Diethylrin	LT 3. -01	ug/g	BUW001
Blank	Endrin	LT 3. -01	ug/g	BUW001
Blank	Isodrin	LT 3. -01	ug/g	BUW001
Blank	Malethion	LT 3. -01	ug/g	BUW001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	BUW001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	BUW001
Blank	Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	BUW001
Blank	Parathion	LT 4. -01	ug/g	BUW001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BUW001
Blank	Aldrin	LT 3. -01	ug/g	BUX001
Blank	Atrazine	LT 3. -01	ug/g	BUX001
Blank	Chlordane	LT 2. +00	ug/g	BUX001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BUX001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BUX001
Blank	p-Chlorophenylmethyl Sulfonate	LT 3. -01	ug/g	BUX001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BUX001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BUX001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BUX001
Blank	Vapona	LT 3. +00	ug/g	BUX001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BUX001
Blank	Dithiane	LT 4. -01	ug/g	BUX001
Blank	Dieldrin	LT 3. -01	ug/g	BUX001
Blank	Endrin	LT 5. -01	ug/g	BUX001
Blank	Isodrin	LT 3. -01	ug/g	BUX001
Blank	Malathion	LT 7. -01	ug/g	BUX001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BUX001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BUX001
Blank	Dichlorodiphenyltrichloro-ethane	LT 5. -01	ug/g	BUX001
Blank	Parathion	LT 9. -01	ug/g	BUX001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 6. -01	ug/g	BUX001
Blank	Arsenic	LT 5.0 +00	ug/g	BVC001
Blank	Mercury	9.30-02	ug/g	BVD001
Blank	Chromium	1.31+01	ug/g	BVJ001
Blank	Copper	5.52+00	ug/g	BVJ001
Blank	Lead	1.61+01	ug/g	BVJ001
Blank	Zinc	3.67+01	ug/g	BVJ001
Blank	Cadmium	LT 7.36-01	ug/g	BVJ001
Blank	Arsenic	2.65+00	ug/g	BVK001
Blank	Mercury	9.60-02	ug/g	BVL001
Blank	Aldrin	LT 3. -01	ug/g	BVM001
Blank	Atrazine	LT 3. -01	ug/g	BVM001
Blank	Chlordane	LT 2. +00	ug/g	BVM001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVM001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVM001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 3. -01	ug/g	BVM001
Blank	n-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVM001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BVM001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BVM001
Blank	Vapona	LT 3. +00	ug/g	BVM001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVM001
Blank	Dithiane	LT 4. -01	ug/g	BVM001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Summary of Analytical Results

Blanks Associated with Task 10
(Chemical Sewers -- South Plants)

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dieldrin	LT 3. -01	ug/g	BVM001
Blank	Endrin	LT 5. -01	ug/g	BVM001
Blank	Isodrin	LT 3. -01	ug/g	BVM001
Blank	Malathion	LT 7. -01	ug/g	BVM001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BVM001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BVM001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVM001
Blank	Parathion	LT 9. -01	ug/g	BVM001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVM001
Blank	Bicycloheptadiene	LT 4. -01	ug/g	BVM001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	BVM001
Blank	Chloroform	LT 3. -01	ug/g	BVM001
Blank	Chlorobenzene	LT 1. +00	ug/g	BVM001
Blank	Benzene	LT 3. -01	ug/g	BVM001
Blank	Dibromochloropropane	LT 2. +00	ug/g	BVM001
Blank	Dicyclopentadiene	LT 7. -01	ug/g	BVM001
Blank	Dimethyldisulfide	LT 2. +01	ug/g	BVM001
Blank	Ethylbenzene	LT 4. -01	ug/g	BVM001
Blank	Toluene	LT 3. -01	ug/g	BVM001
Blank	Methylisobutyl Ketone	LT 7. -01	ug/g	BVM001
Blank	Tetrachloroethene	LT 3. -01	ug/g	BVM001
Blank	Trichloroethene	LT 5. -01	ug/g	BVM001
Blank	1,1-Dichloroethane	LT 2. +00	ug/g	BVM001
Blank	1,1,1-Trichloroethane	LT 4. -01	ug/g	BVM001
Blank	1,1,2-Trichloroethane	LT 4. -01	ug/g	BVM001
Blank	1,2-Dichloroethane	LT 2. +00	ug/g	BVM001
Blank	1,2-Dichloroethane	LT 6. -01	ug/g	BVM001
Blank	m-Xylene	LT 8. -01	ug/g	BVM001
Blank	Methylene Chloride	3.5 +00	ug/g	BVM001
Blank	Ortho- & Para-Xylene	LT 5. -01	ug/g	BVM001
Blank	Methylene Chloride	3.5 +00	ug/g	BVM001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	BVM001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Fluoro Services, Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Aldrin	LT 3. -01	ug/g	BVP001
Blank	Atrazine	LT 3. -01	ug/g	BVP001
Blank	Chlordane	LT 6. -01	ug/g	BVP001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	BVP001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BVP001
Blank	p-Chlorophenylmethyl Sulfonate	LT 7. +00	ug/g	BVP001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BVP001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BVP001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	BVP001
Blank	Vapona	LT 3. -01	ug/g	BVP001
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BVP001
Blank	Dithiane	LT 7. +00	ug/g	BVP001
Blank	Dieldrin	LT 3. -01	ug/g	BVP001
Blank	Endrin	LT 3. -01	ug/g	BVP001
Blank	Isodrin	LT 3. -01	ug/g	BVP001
Blank	Malathion	LT 3. -01	ug/g	BVP001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	BVP001
Blank	Dichlorodiphenyltrichloro-ethane	LT 6. -01	ug/g	BVP001
Blank	Parathion	LT 4. -01	ug/g	BVP001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 3. -01	ug/g	BVP001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BV0001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BV0001
Blank	Chromium	1.29+01	ug/g	BV0001
Blank	Copper	8.68+00	ug/g	BV0001
Blank	Lead	1.02+01	ug/g	BV0001
Blank	Zinc	3.57+01	ug/g	BV0001
Blank	Cadmium	LT 7.36-01	ug/g	BV0001
Blank	Cadmium	LT 7.36-01	ug/g	BV0001
Blank	Bicycloheptadiene	LT 4. -01	ug/g	BV0001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	BV0001
Blank	Chloroform	LT 3. -01	ug/g	BV0001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
(Chemical Sewers -- South Plants)

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Methylene Chloride	LT 2. +00	ug/g	BVW001
Blank	Chlorobenzene	LT 1. +00	ug/g	BVW001
Blank	Benzene	LT 3. -01	ug/g	BVW001
Blank	Dibromochloropropane	LT 2. +00	ug/g	BVW001
Blank	Dicyclopentadiene	LT 7. -01	ug/g	BVW001
Blank	Dimethyldisulfide	LT 2. +01	ug/g	BVW001
Blank	Ethylbenzene	LT 4. -01	ug/g	BVW001
Blank	Toluene	LT 3. -01	ug/g	BVW001
Blank	Methylisobutyl Ketone	LT 7. -01	ug/g	BVW001
Blank	Tetrachloroethene	LT 3. -01	ug/g	BVW001
Blank	Trichloroethene	LT 5. -01	ug/g	BVW001
Blank	Ortho- & Para-Xylene	LT 5. +00	ug/g	BVW001
Blank	1,1-Dichloroethane	LT 2. +00	ug/g	BVW001
Blank	1,1,1-Trichloroethane	LT 4. -01	ug/g	BVW001
Blank	1,1,2-Trichloroethane	LT 4. -01	ug/g	BVW001
Blank	1,2-Dichloroethene	LT 2. +00	ug/g	BVW001
Blank	1,2-Dichloroethane	LT 6. -01	ug/g	BVW001
Blank	m-Xylene	LT 8. -01	ug/g	BVW001
Blank	Aldrin	LT 3. -01	ug/g	BVZ001
Blank	Atrazine	LT 3. -01	ug/g	BVZ001
Blank	Chlordane	LT 2. +00	ug/g	BVZ001
Blank	Dieldrin	LT 3. -01	ug/g	BVZ001
Blank	Endrin	LT 5. -01	ug/g	BVZ001
Blank	Isodrin	LT 3. -01	ug/g	BVZ001
Blank	Malathion	LT 7. -01	ug/g	BVZ001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BVZ001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BVZ001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BVZ001
Blank	Parathion	LT 9. -01	ug/g	BVZ001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BVZ001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BVZ001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BVZ001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	p-Chlorophenylmethyl Sulfide	LT 3. -01	ug/g	BVZ001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BVZ001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BVZ001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BVZ001
Blank	Vapona	LT 3. +00	ug/g	BVZ001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BVZ001
Blank	Dithiane	LT 4. -01	ug/g	BVZ001
Blank	Aldrin	LT 3. -01	ug/g	BWA001
Blank	Atrazine	LT 3. -01	ug/g	BWA001
Blank	Chlordane	LT 2. +00	ug/g	BWA001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BWA001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BWA001
Blank	p-Chlorophenylmethyl Sulfide	LT 3. -01	ug/g	BWA001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BWA001
Blank	1,1-Dibromochloropropane	LT 3. -01	ug/g	BWA001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BWA001
Blank	Vapona	LT 3. +00	ug/g	BWA001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BWA001
Blank	Dithiane	LT 4. -01	ug/g	BWA001
Blank	Dieldrin	LT 3. -01	ug/g	BWA001
Blank	Endrin	LT 5. -01	ug/g	BWA001
Blank	Isodrin	LT 3. -01	ug/g	BWA001
Blank	Malathion	LT 7. -01	ug/g	BWA001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BWA001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BWA001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BWA001
Blank	Parathion	LT 9. -01	ug/g	BWA001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidene Phosphates	LT 6. -01	ug/g	BWA001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	BWC001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	BWC001
Blank	Chloroform	LT 3. -01	ug/g	BWC001
Blank	Methylene Chloride	LT 9. -01	ug/g	BWC001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Agents - South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Chlorobenzene	LT 3. -01	ug/g	BW0001
Blank	Benzene	LT 3. -01	ug/g	BW0001
Blank	Dibromochloropropane	LT 4. -01	ug/g	BW0001
Blank	Dicyclopentadiene	LT 3. -01	ug/g	BW0001
Blank	Ethylbenzene	LT 3. -01	ug/g	BW0001
Blank	Toluene	LT 3. -01	ug/g	BW0001
Blank	Methylisobutyl ketone	LT 3. -01	ug/g	BW0001
Blank	Tetrachloroethene	LT 3. -01	ug/g	BW0001
Blank	Trichloroethene	LT 3. -01	ug/g	BW0001
Blank	Ortho- & Para-Xylene	LT 3. -01	ug/g	BW0001
Blank	1,1,1-Trichloroethane	LT 3. -01	ug/g	BW0001
Blank	1,1,2-Trichloroethane	LT 3. -01	ug/g	BW0001
Blank	1,2-Dichloroethene	LT 3. -01	ug/g	BW0001
Blank	1,2-Dichloroethane	LT 3. -01	ug/g	BW0001
Blank	m-Xylene	LT 7. -01	ug/g	BW0001
Blank	Dimethyldisulfide	LT 8. -01	ug/g	BW0001
Blank	1,1-Dichloroethane	LT 9. -01	ug/g	BW0001
Blank	Bicycloheptadiene	LT 4. -01	ug/g	BW0001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	BW0001
Blank	Chloroform	LT 3. -01	ug/g	BW0001
Blank	Methylene Chloride	LT 2. +00	ug/g	BW0001
Blank	Chlorobenzene	LT 1. +00	ug/g	BW0001
Blank	Benzene	LT 3. -01	ug/g	BW0001
Blank	Dibromochloropropane	LT 2. +00	ug/g	BW0001
Blank	Dicyclopentadiene	LT 7. -01	ug/g	BW0001
Blank	Dimethyldisulfide	LT 2. +01	ug/g	BW0001
Blank	Ethylbenzene	LT 4. -01	ug/g	BW0001
Blank	Toluene	LT 3. -01	ug/g	BW0001
Blank	Methylisobutyl ketone	LT 7. -01	ug/g	BW0001
Blank	Tetrachloroethene	LT 3. -01	ug/g	BW0001
Blank	Trichloroethane	LT 5. -01	ug/g	BW0001
Blank	Ortho- & Para-Xylene	LT 5. +00	ug/g	BW0001
Blank	1,1-Dichloroethane	LT 2. +00	ug/g	BW0001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Summary of Analytical Results

Blanks Associated with Task 10
Chemical Layers -- South Plants

Type	Analytical Parameters	Results	Units	Sample Number
Blank	1,1,1-Trichloroethane	LT 4. -01	ug/g	BWD001
Blank	1,1,2-Trichloroethane	LT 4. -01	ug/g	BWD001
Blank	1,2-Dichloroethane	LT 2. +00	ug/g	BWD001
Blank	m-Xylene	LT 8. -01	ug/g	BWD001
Blank	1,2-Dichloroethane	LT 6. -01	ug/g	BWD001
Blank	Mercury	1.05-01	ug/g	BWD001
Blank	Arsenic	2.55+00	ug/g	BWF001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BX0001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BX0001
Blank	Arsenic	2.93+00	ug/g	BYZ001
Blank	Aldrin	LT 3. -01	ug/g	BZD001
Blank	Atrazine	LT 3. -01	ug/g	BZU001
Blank	Chlordane	LT 6. -01	ug/g	BZD001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	BZD001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BZD001
Blank	p-Chlorophenylmethyl Sulfonide	LT 7. +00	ug/g	BZD001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BZD001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BZD001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	BZD001
Blank	Vapona	LT 3. -01	ug/g	BZD001
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BZD001
Blank	Blthiane	LT 7. +00	ug/g	BZD001
Blank	Dieldrin	LT 3. -01	ug/g	BZD001
Blank	Endrin	LT 3. -01	ug/g	BZD001
Blank	Isodrin	LT 3. -01	ug/g	BZD001
Blank	Malathion	LT 3. -01	ug/g	BZD001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	BZD001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	BZD001
Blank	Dichlorodiphenyltrichloro- ethane	LT 6. -01	ug/g	BZD001
Blank	Parathion	LT 4. -01	ug/g	BZD001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylethyl Phosphates	LT 3. -01	ug/g	BZD001
Blank	Chromium	1.57+01	ug/g	BZE001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ehasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Test in
(Chemical Sewers - South Plants)

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Copper	8.28+00	ug/g	BZE001
Blank	Lead	1.12+01	ug/g	BZE001
Blank	Zinc	3.98+01	ug/g	BZE001
Blank	Cadmium	LT 7.36-01	ug/g	BZE001
Blank	Mercury	5.90-02	ug/g	BZF001
Blank	Aldrin	LT 2.5 -01	ug/g	BZH001
Blank	Atrazine	LT 2.5 -01	ug/g	BZH001
Blank	Chlordane	LT 1.7 +00	ug/g	BZH001
Blank	Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	BZH001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	BZH001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	BZH001
Blank	p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	BZH001
Blank	Dibromochloropropane	LT 2.8 -01	ug/g	BZH001
Blank	Dicyclopentadiene	LT 1.1 +00	ug/g	BZH001
Blank	Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	BZH001
Blank	Dithiane	LT 3.6 -01	ug/g	BZH001
Blank	Dieldrin	LT 2.5 -01	ug/g	BZH001
Blank	Endrin	LT 4.6 -01	ug/g	BZH001
Blank	Isodrin	LT 2.9 -01	ug/g	BZH001
Blank	Malathion	LT 7.1 -01	ug/g	BZH001
Blank	1,4-Oxathiane	LT 2.5 -01	ug/g	BZH001
Blank	Dichlorodiphenylethane	LT 5.7 -01	ug/g	BZH001
Blank	Dichlorodiphenyltrichloro-ethane	LT 4.7 -01	ug/g	BZH001
Blank	Parathion	LT 8.5 -01	ug/g	BZH001
Blank	2-Chloro-1(2,4-dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	BZH001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	BZI001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	BZI001
Blank	Chloroform	LT 3. -01	ug/g	BZI001
Blank	Methylene Chloride	LT 7. -01	ug/g	BZI001
Blank	Chlorobenzene	LT 3. -01	ug/g	BZI001
Blank	Benzene	LT 3. -01	ug/g	BZI001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Summary of Analytical Results

Blanks Associated with Task 10
Chemical Sewers -- South Plants

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Chlordane	LT 2.0 +00	ug/g	BZL001
Blank	Dichlorodiphenylethane	LT 6.0 -01	ug/g	BZL001
Blank	Dieldrin	LT 3.0 -01	ug/g	BZL001
Blank	Endrin	LT 5.0 -01	ug/g	BZL001
Blank	Dichlorodiphenyltrichloroethane	LT 5.0 -01	ug/g	BZL001
Blank	Dimethyldisulfide	LT 2.0 +01	ug/g	BZM001
Blank	Chlorobenzene	LT 1.5 +00	ug/g	BZM001
Blank	Dibromochloropropane	LT 2.4 +00	ug/g	BZM001
Blank	Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZM001
Blank	Trichloroethene	LT 5.4 -01	ug/g	BZM001
Blank	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZM001
Blank	Carbon Tetrachloride	LT 2.5 -01	ug/g	BZM001
Blank	Chloroform	LT 2.9 -01	ug/g	BZM001
Blank	Methylene Chloride	LT 1.5 +00	ug/g	BZM001
Blank	Benzene	LT 2.5 -01	ug/g	BZM001
Blank	Dicyclopentadiene	LT 6.4 -01	ug/g	BZM001
Blank	Ethylbenzene	LT 3.8 -01	ug/g	BZM001
Blank	Toluene	LT 2.5 -01	ug/g	BZM001
Blank	Tetrachloroethene	LT 2.5 -01	ug/g	BZM001
Blank	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZM001
Blank	1,1-Dichloroethane	LT 1.7 +00	ug/g	BZM001
Blank	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZM001
Blank	1,2-Dichloroethane	LT 5.6 -01	ug/g	BZM001
Blank	m-Xylene	LT 7.4 -01	ug/g	BZM001
Blank	Bicycloheptadiene	LT 3.6 -01	ug/g	BZM001
Blank	1,2-Dichloroethene	LT 1.7 +00	ug/g	BZM001
Blank	Arsenic	LT 5.0 +00	ug/g	BZM001
Blank	Cadmium	LT 6.6 -01	ug/g	BZ0001
Blank	Chromium	LT 5.2 +00	ug/g	BZ0001
Blank	Copper	LT 4.9 +00	ug/g	BZ0001
Blank	Lead	LT 1.3 +01	ug/g	BZ0001
Blank	Zinc	LT 9.5 +00	ug/g	BZ0001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Mercury	6.50-02	ug/g	BZP001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BZQ001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BZQ001
Blank	Bicycloheptadiene	LT 3.6 -01	ug/g	BZR001
Blank	Carbon Tetrachloride	LT 2.5 -0	ug/g	BZR001
Blank	Chloroform	LT 2.9 -01	ug/g	BZR001
Blank	Methylene Chloride	LT 1.5 +00	ug/g	BZR001
Blank	Chlorobenzene	LT 1.5 +00	ug/g	BZR001
Blank	Benzene	LT 2.5 -01	ug/g	BZR001
Blank	Dibromochloropropane	LT 2.4 +00	ug/g	BZR001
Blank	Dicyclopentadiene	LT 6.4 -01	ug/g	BZR001
Blank	Ethylbenzene	LT 3.8 -01	ug/g	BZR001
Blank	Toluene	LT 2.5 -01	ug/g	BZR001
Blank	Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZR001
Blank	Tetrachloroethene	LT 2.5 -01	ug/g	BZR001
Blank	Trichloroethene	LT 5.4 -01	ug/g	BZR001
Blank	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZR001
Blank	1,1-Dichloroethane	LT 1.7 +00	ug/g	BZR001
Blank	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZR001
Blank	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZR001
Blank	1,2-Dichloroethene	LT 1.7 +00	ug/g	BZR001
Blank	1,2-Dichloroethane	LT 5.6 -01	ug/g	BZR001
Blank	m-Xylene	LT 7.4 -01	ug/g	BZR001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	BZS001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	BZS001
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	BZS001
Blank	Dithiane	LT 7. +00	ug/g	BZS001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BZS001
Blank	Vapona	LT 3. -01	ug/g	BZS001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	BZS001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	BZS001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	BZS001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	BZS001
Blank	Atrazine	LT 3. -01	ug/g	BZS001

Note: Blanks are matched to analytical ints by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- South Plants

01/27/86

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Malathion	LT 3. -01	ug/g	BZS001
Blank	Aldrin	LT 3. -01	ug/g	BZS001
Blank	Perathion	LT 4. -01	ug/g	BZS001
Blank	Isodrin	LT 3. -01	ug/g	BZS001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyl diethyl Phosphates	LT 3. -01	ug/g	BZS001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	BZS001
Blank	Dieldrin	LT 3. -01	ug/g	BZS001
Blank	Endrin	LT 3. -01	ug/g	BZS001
Blank	Dichlorodiphenyltrichloro- ethane	LT 6. -01	ug/g	BZS001
Blank	Chlordane	LT 6. -01	ug/g	BZS001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BZT001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BZT001
Blank	Bicycloheptadiene	LT 3.6 -01	ug/g	BZU001
Blank	Carbon Tetrachloride	LT 2.5 -01	ug/g	BZU001
Blank	Chloroform	LT 2.9 -01	ug/g	BZU001
Blank	Methylene Chloride	LT 1.5 +00	ug/g	BZU001
Blank	Chlorobenzene	LT 1.5 +00	ug/g	BZU001
Blank	Benzene	LT 2.5 -01	ug/g	BZU001
Blank	Dibromochloropropane	LT 2.4 +00	ug/g	BZU001
Blank	Dicyclopentadiene	LT 6.4 -01	ug/g	BZU001
Blank	Ethylbenzene	LT 3.8 -01	ug/g	BZU001
Blank	Toluene	LT 2.5 -01	ug/g	BZU001
Blank	Methylisobutyl Ketone	LT 7.3 -01	ug/g	BZU001
Blank	Tetrachloroethene	LT 2.5 -01	ug/g	BZU001
Blank	Trichloroethene	LT 5.4 -01	ug/g	BZU001
Blank	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	BZU001
Blank	1,1-Dichloroethane	LT 1.7 +00	ug/g	BZU001
Blank	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	BZU001
Blank	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	BZU001
Blank	1,2-Dichloroethane	LT 1.7 +00	ug/g	BZU001
Blank	1,2-Dichloroethane	LT 5.6 -01	ug/g	BZU001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	m-Xylene	LT 7.4 -01	ug/g	BZU001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BZV001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BZV001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	BZU001
Blank	Thiodiglycol	LT 4.20+00	ug/g	BZU001
Blank	Mercury	LT 5.00-02	ug/g	BZX001
Blank	Arsenic	3.47+00	ug/g	BZX001
Blank	Chromium	1.61+01	ug/g	CAA001
Blank	Copper	8.69+00	ug/g	CAA001
Blank	Lead	1.24+01	ug/g	CAA001
Blank	Zinc	4.32+01	ug/g	CAA001
Blank	Cadmium	LT 7.36-01	ug/g	CAA001
Blank	Aldrin	LT 3. -01	ug/g	CAC001
Blank	Atrazine	LT 3. -01	ug/g	CAC001
Blank	Chlordane	LT 6. -01	ug/g	CAC001
Blank	Hexachlorocyclopentadiene	LT 3. -01	ug/g	CAC001
Blank	p-Chlorophenylmethyl Sulfide	LT 4. +00	ug/g	CAC001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 7. +00	ug/g	CAC001
Blank	p-Chlorophenylmethyl Sulfone	LT 6. -01	ug/g	CAC001
Blank	Dibromochloropropane	LT 3. -01	ug/g	CAC001
Blank	Dicyclopentadiene	LT 4. -01	ug/g	CAC001
Blank	Vapona	LT 3. -01	ug/g	CAC001
Blank	Diisopropylmethyl Phosphonate	LT 3. -01	ug/g	CAC001
Blank	Disulfane	LT 7. +00	ug/g	CAC001
Blank	Dieldrin	LT 3. -01	ug/g	CAC001
Blank	Endrin	LT 3. -01	ug/g	CAC001
Blank	Isodrin	LT 3. -01	ug/g	CAC001
Blank	Melathion	LT 3. -01	ug/g	CAC001
Blank	1,4-Oxathiane	LT 6. +00	ug/g	CAC001
Blank	Dichlorodiphenylethane	LT 3. -01	ug/g	CAC001
Blank	Dichlorodiphenyltrichloroethane	LT 6. -01	ug/g	CAC001
Blank	Parathion	LT 4. -01	ug/g	CAC001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinyllethyl phosphates	LT 3. -01	ug/g	CAC001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Vapone	LT 3.0 +00	ug/g	CAD001
Blank	Aldrin	LT 2.5 -01	ug/g	CAD001
Blank	Atrazine	LT 2.5 -01	ug/g	CAD001
Blank	Chlordane	LT 1.7 +00	ug/g	CAD001
Blank	Hexachlorocyclopentadiene	LT 5.7 -01	ug/g	CAD001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.1 -01	ug/g	CAD001
Blank	p-Chlorophenylmethyl Sulfoxide	LT 2.5 -01	ug/g	CAD001
Blank	p-Chlorophenylmethyl Sulfone	LT 2.5 -01	ug/g	CAD001
Blank	Dibromochloropropane	LT 2.8 -01	ug/g	CAD001
Blank	Dicyclopentadiene	LT 1.1 +00	ug/g	CAD001
Blank	Diisopropylmethyl Phosphonate	LT 1.1 +00	ug/g	CAD001
Blank	Dithiane	LT 3.6 -01	ug/g	CAD001
Blank	Dieldrin	LT 2.5 -01	ug/g	CAD001
Blank	Endrin	LT 4.6 -01	ug/g	CAD001
Blank	Isodrin	LT 2.9 -01	ug/g	CAD001
Blank	Malathion	LT 7.1 -01	ug/g	CAD001
Blank	1,4-Oxathiane	LT 2.5 -01	ug/g	CAD001
Blank	Dichlorodiphenylethane	LT 5.7 -01	ug/g	CAD001
Blank	Dichlorodiphenyltrichloro-ethane	LT 4.7 -01	ug/g	CAD001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6.1 -01	ug/g	CAD001
Blank	Dimethyldisulfide	LT 2.0 +01	ug/g	CAE001
Blank	Bicycloheptadiene	LT 3.6 -01	ug/g	CAE001
Blank	Carbon Tetrachloride	LT 2.5 -01	ug/g	CAE001
Blank	Chloroform	LT 2.9 -01	ug/g	CAE001
Blank	Methylene Chloride	LT 1.5 +00	ug/g	CAE001
Blank	Chlorobenzene	LT 1.5 +00	ug/g	CAE001
Blank	Benzene	LT 2.5 -01	ug/g	CAE001
Blank	Dibromochloropropane	LT 2.4 +00	ug/g	CAE001
Blank	Dicyclopentadiene	LT 6.4 -01	ug/g	CAE001
Blank	Ethylbenzene	LT 3.8 -01	ug/g	CAE001
Blank	Toluene	LT 2.5 -01	ug/g	CAE001
Blank	Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAE001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Thayer Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Tetrachloroethene	LT 2.5 -01	ug/g	CAE001
Blank	Trichloroethene	LT 5.4 -01	ug/g	CAE001
Blank	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAE001
Blank	1,1-Dichloroethene	LT 1.7 +00	ug/g	CAE001
Blank	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAE001
Blank	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAE001
Blank	1,2-Dichloroethene	LT 1.7 +00	ug/g	CAE001
Blank	1,2-Dichloroethane	LT 5.6 -01	ug/g	CAE001
Blank	m-Xylene	LT 7.4 -01	ug/g	CAE001
Blank	Bicycloheptadiene	LT 3. -01	ug/g	CAE001
Blank	Carbon Tetrachloride	LT 3. -01	ug/g	CAE001
Blank	Chloroform	LT 3. -01	ug/g	CAE001
Blank	Methylene Chloride	LT 7. -01	ug/g	CAE001
Blank	Chlorobenzene	LT 3. -01	ug/g	CAE001
Blank	Benzene	LT 3. -01	ug/g	CAE001
Blank	Dibromochloropropane	LT 4. -01	ug/g	CAE001
Blank	Dicyclopentadiene	LT 3. -01	ug/g	CAE001
Blank	Dimethylsulfide	LT 8. -01	ug/g	CAE001
Blank	Ethylbenzene	LT 3. -01	ug/g	CAE001
Blank	Toluene	LT 3. -01	ug/g	CAE001
Blank	Methylisobutyl Ketone	LT 3. -01	ug/g	CAE001
Blank	Tetrachloroethene	LT 3. -01	ug/g	CAE001
Blank	Trichloroethene	LT 3. -01	ug/g	CAE001
Blank	Ortho- & Para-Xylene	LT 3. -01	ug/g	CAE001
Blank	1,1-Dichloroethane	LT 9. -01	ug/g	CAE001
Blank	1,1,1-Trichloroethane	LT 3. -01	ug/g	CAE001
Blank	1,1,2-Trichloroethane	LT 3. -01	ug/g	CAE001
Blank	1,2-Dichloroethane	LT 3. -01	ug/g	CAE001
Blank	m-Xylene	LT 7. -01	ug/g	CAE001
Blank	1,2-Dichloroethene	LT 3. -01	ug/g	CAE001
Blank	Cadmium	LT 7.36 -01	ug/g	CAG001
Blank	Lead	LT 8.38 +00	ug/g	CAG001
Blank	Chromium	LT 1.41 +01	ug/g	CAG001
Blank	Copper	9.61 +00	ug/g	CAG001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program

01/27/88

Blanks Associated with Task 10
Chemical Sewers -- South Plants

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Zinc	4.09+01	ug/g	CAG001
Blank	Arsenic	2.99+00	ug/g	CAH001
Blank	Mercury	5.30-02	ug/g	CAI001
Blank	Chloroacetic Acid	LT 3.55+01	ug/g	CAK001
Blank	Thiodiglycol	LT 4.20+00	ug/g	CAK001
Blank	Chlorobenzene	LT 1.5 +00	ug/g	CAL001
Blank	Dibromochloropropane	LT 2.4 +00	ug/g	CAL001
Blank	Methylisobutyl Ketone	LT 7.3 -01	ug/g	CAL001
Blank	Trichloroethene	LT 5.4 -01	ug/g	CAL001
Blank	1,1,1-Trichloroethane	LT 4.3 -01	ug/g	CAL001
Blank	Bicycloheptadiene	LT 3.6 -01	ug/g	CAL001
Blank	Carbon Tetrachloride	LT 2.5 -01	ug/g	CAL001
Blank	Chloroform	LT 2.9 -01	ug/g	CAL001
Blank	Methylene Chloride	LT 1.5 +00	ug/g	CAL001
Blank	Benzene	LT 2.5 -01	ug/g	CAL001
Blank	Dicyclopentadiene	LT 6.4 -01	ug/g	CAL001
Blank	Ethylbenzene	LT 3.8 -01	ug/g	CAL001
Blank	Toluene	LT 2.5 -01	ug/g	CAL001
Blank	Tetrachloroethene	LT 2.5 -01	ug/g	CAL001
Blank	Ortho- & Para-Xylene	LT 4.9 +00	ug/g	CAL001
Blank	1,1-Dichloroethane	LT 1.7 +00	ug/g	CAL001
Blank	1,1,2-Trichloroethane	LT 3.9 -01	ug/g	CAL001
Blank	1,2-Dichloroethane	LT 1.7 +00	ug/g	CAL001
Blank	1,2-Dichloroethane	LT 5.6 -01	ug/g	CAL001
Blank	m-Xylene	LT 7.4 -01	ug/g	CAL001
Blank	Dimethyldisulfide	LT 2.0 +01	ug/g	CAL001
Blank	Aldrin	LT 3.0 -01	ug/g	CAM001
Blank	Atrazine	LT 3.0 -01	ug/g	CAM001
Blank	Hexachlorocyclopentadiene	LT 6.0 -01	ug/g	CAM001
Blank	Chlordane	LT 2.0 +00	ug/g	CAM001
Blank	p-Chlorophenylmethyl Sulfide	LT 9.0 -01	ug/g	CAM001
Blank	p-Chlorophenylmethyl Sulfonide	LT 3.0 -01	ug/g	CAM001
Blank	p-Chlorophenylmethyl Sulfone	LT 3.0 -01	ug/g	CAM001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Fraser Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers - South Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Dibromochloropropane	LT 3.0 -01	ug/g	CAM001
Blank	Dicyclopentadiene	LT 1.0 +00	ug/g	CAM001
Blank	Vapona	LT 3.0 +00	ug/g	CAM001
Blank	Diisopropylmethyl Phosphonate	LT 1.0 +00	ug/g	CAM001
Blank	Dithiane	LT 4.0 -01	ug/g	CAM001
Blank	Dieldrin	LT 3.0 -01	ug/g	CAM001
Blank	Endrin	LT 5.0 -01	ug/g	CAM001
Blank	Isodrin	LT 3.0 -01	ug/g	CAM001
Blank	Malathion	LT 7.0 -01	ug/g	CAM001
Blank	1,4-Oxathiane	LT 3.0 -01	ug/g	CAM001
Blank	Dichlorodiphenylethane	LT 6.0 -01	ug/g	CAM001
Blank	Dichlorodiphenyltrichloro- ethane	LT 5.0 -01	ug/g	CAM001
Blank	Parathion	LT 9.0 -01	ug/g	CAM001
Blank	2-chloro-1(2,4-Dichlorophenyl) Vinylmethyl Phosphates	LT 6.0 -01	ug/g	CAM001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Ebasco Services Incorporated
Summary of Analytical Results

Rocky Mountain Arsenal Program
Blanks Associated with Task 10
Chemical Sewers -- North Plants

01/27/88

Type	Analytical Parameters	Results	Units	Sample Number
Blank	Aldrin	LT 3. -01	ug/g	BRK101
Blank	Atrazine	LT 3. -01	ug/g	BRD001
Blank	Chlordane	LT 2. +00	ug/g	BRD001
Blank	Hexachlorocyclopentadiene	LT 6. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfide	LT 9. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfonate	LT 3. -01	ug/g	BRD001
Blank	p-Chlorophenylmethyl Sulfone	LT 3. -01	ug/g	BRD001
Blank	Dibromochloropropane	LT 3. -01	ug/g	BRD001
Blank	Dicyclopentadiene	LT 1. +00	ug/g	BRD001
Blank	Vapona	LT 3. +00	ug/g	BRD001
Blank	Diisopropylmethyl Phosphonate	LT 1. +00	ug/g	BRD001
Blank	Dithiane	LT 4. -01	ug/g	BRD001
Blank	Dieldrin	LT 3. -01	ug/g	BRD001
Blank	Endrin	LT 5. -01	ug/g	BRD001
Blank	Isodrin	LT 3. -01	ug/g	BRD001
Blank	Malathion	LT 2. -01	ug/g	BRD001
Blank	1,4-Oxathiane	LT 3. -01	ug/g	BRD001
Blank	Dichlorodiphenylethane	LT 6. -01	ug/g	BRD001
Blank	Dichlorodiphenyltrichloroethane	LT 5. -01	ug/g	BRD001
Blank	Parathion	LT 9. -01	ug/g	BRD001
Blank	2-Chloro-1(2,4-Dichlorophenyl) Vinylidethyl Phosphates	LT 6. -01	ug/g	BRD001
Blank	Cadmium	LT 7.56+01	ug/g	BRD001
Blank	Chromium	1.01+01	ug/g	BRD001
Blank	Copper	1.07+01	ug/g	BRD001
Blank	Lead	1.15+01	ug/g	BRD001
Blank	Zinc	2.56+01	ug/g	BRD001
Blank	Mercury	1.10 01	ug/g	BRD001
Blank	Chromium	LT 5.2 +00	ug/g	BRD001
Blank	Copper	LT 4.9 +00	ug/g	BRD001
Blank	Lead	LT 1.3 +01	ug/g	BRD001
Blank	Zinc	LT 2.5 +00	ug/g	BRD001
Blank	Arsenic	2.20+00	ug/g	BRD001

Note: Blanks are matched to analytical lots by the first three characters in the Sample Number.

Appendix CS-C

**Calculations for the Structural
Stability of the Pipe in
Trenches CS01, CS02, and CS03**

APPENDIX C

Trench CS01

Given Conditions

- o Bedding Class D (the worst per ASTM C12-82)
Therefore, Load Factor (LF) = 1-1
- o Backfill above pipe = 4 ft
- o Trench/Backfill material = clay = 120 lbs/cu ft
- o Three-edge bearing strength (3-EBS) for 6" Dia standard strength vitrified clay pipe per ASTM C700-78a = 1200 lbs/ lin ft

Calculations

- o Trench Earth Load (TEL) = dead load = 600 lb/lin ft
- o Field Supporting Strength (FSS):
$$FSS = LF \times 3\text{-EBS}$$
$$= 1.1 \times 1,200 = 1,320 \text{ lbs/lin ft.}$$
- o Safety Factor (SF):
$$SF = \frac{FSS}{TEL} = \frac{1,320}{600} = 2.2$$

Conclusions

- o Acceptable Safety Factor per ASTM C12-82: greater than 1.0, but less than 1.5
- o Safety Factor is adequate.

Trench CS02

Given Conditions

- o Bedding Class D (the worst per ASTM C12-82)
Therefore, Load Factor = 1-1
- o Backfill above pipe = 6.5 ft
- o Trench/backfill material = clay = 120 lbs/cu ft
- o Three-edge bearings strength (3-EBS) for 10" dia standard strength vitrified clay pipe per ASTM C700-78a = 1,600 lbs/lin ft

Calculations

- o Trench Earth Load (TEL) = dead load = 1,250 lb/lin ft
- o Field Supporting Strength (FSS):
FSS = LF X 3=EBS
= 1.1 X 1,600 = 1,760 lbs/lin ft.
- o Safety Factor (SF):
SF = $\frac{FSS}{TEL} = \frac{1,760}{1,260} = 1.4$

Conclusions

- o Acceptable Safety Factor per ASTM C12-82 = greater than 1.0, but less than 1.5
- o Safety Factor is acceptable.

Trench CS03

Given Conditions

- o Bedding Class D (the worst per ASTM C12-82)
Therefore, Load Factor = 1-1
- o Backfill above pipe = 10 ft
- o Trench/backfill material = clay = 120 lbs/cu ft
- o Three-edge bearings strength (3-EBS) for 8" dia standard strength vitrified clay pipe per ASTM C700-78a = 1,400 lbs/lin ft

Calculations

- o Trench Earth Load (TEL) = dead load = 1,450 lb/lin ft
- o Field Supporting Strength (FSS):
FSS = LF X 3-EBS
= 1.1 X 1,400 = 1,540 lbs/lin ft
- o Safety Factor (SF):
SF = FSS = 1,540 = 1.06
TEL 1,450

Conclusions

- o Acceptable Safety Factor per ASTM C12-82 = greater than 1.0, but less than 1.5
- o Safety Factor is acceptable.

Appendix CS-D

Comments and Responses

Shell Oil Company



c/o Holms Roberts & Owen
Suite 1800
1700 Broadway
Denver, CO 80200

April 22, 1988

Office of the Program Manager
for Rocky Mountain Arsenal
ATTN: AMXRM-PM: Mr. Donald L. Campbell
Building E-4460
Aberdeen Proving Ground, Maryland 21010-5401

Dear Mr. Campbell:

Enclosed herewith are Shell Oil's comments on two Draft Final Contamination Assessment Reports: Process Water System, Task No. 10, February 1988, and Chemical Sewer - North Plants and Chemical Sewer - South Plants, Task No. 10, March 1988.

Sincerely,

C. K. Hahn
Manager
Denver Site Project

RDL:ajg

Enclosure

cc: (w/enclosure)
Office of the Program Manager for Rocky Mountain Arsenal
ATTN: AMXRM-RP: Mr. Kevin T. Blose, Acting Chief
Aberdeen Proving Ground, Maryland 21010-5401

Office of the Program Manager for Rocky Mountain Arsenal
ATTN: AMXRM-T): Mr. Brian L. Anderson
Commerce City, Colorado 80022-2180



RESPONSES TO COMMENTS OF
SHELL OIL COMPANY ON
DRAFT FINAL CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS AND SOUTH PLANTS

Chemical Sewer - North Plants

Comment 1: Page 9, 2.0 History.

Reference should be made to the History section in the Contamination Assessment Report on the North Plants Complex, Task 42, which contains a more detailed description of major operations conducted in the North Plants Complex.

The operating period for the manufacture of GB should be noted.

Response: A reference to the history section of the North Plants Contamination Assessment Report has been added to the text. The operating period for the manufacture of GB has also been noted.

Comment 2: Page 11, last sentence (which carries over to page 12).

A similar study was also performed by Parsons in 1954.

Response: The Parsons document has been reviewed and the pertinent information has been added to the text.

Comment 3: Page 12, first full paragraph.

In the fourth sentence, the phrase ". . . two orders of magnitude less than what was being generated in the South Plants manufacturing area. . ." is irrelevant to this investigation of the North Plant's chemical sewer and should be deleted.

In the fifth sentence, a description of the chemical composition of neutralized off-standard batches of agents routed to the 1727 sump should be added.

Response: The comparison to the amount of waste generated in South Plants has been eliminated. In addition, results from this study regarding waste flows in the South Plants area have been added to the history section in the South Plants portion of this report.

The USAEHA report (1965) does not include a description of the chemical composition of neutralized agents routed to the 1727 sump.

Comment 4: Page 35, last paragraph.

At best, results of this investigation can only be extrapolated over the VCP portion of the North Plants chemical sewer. Since there is no investigation of any kind of the cast iron and steel sections or within the North Plants proper, the assumption that the VCP sections represent a worse-case estimate of leakage is unwarranted.

Response: Investigation of the cast iron collection system (upstream of sump 1727) and the pressurized line from the sump to Manhole 5-4 would have been impractical. The sewers study was based on investigations of "worst-case" pipe conditions. That is, those sections of the pipe, based on type of construction and historic information, that were suspected to contain breaks or leaks. The collection system in the North Plants proper has no manholes, and therefore hasn't been subject to video and visual inspections as other parts of the chemical sewer have. With no knowledge of leaks or breaks, any attempt to locate such a point on the collection system would have been random and impractical for this study. The only documented leak in the cast iron collection system of North Plants is the leakage associated with repair of the system on the east side of Building 1501 in approximately 1979 (Mitchell, 1986). Unfortunately, the location was not identified even imprecisely. Additionally, the extensive underground process and utility pipelines in this area limit access to the chemical sewer and could prevent identification of the sewer as the source of any contamination found in this area. The only other portion of the chemical sewer serving North Plants that is suspected to have leaked is the VCP section. Therefore, this was the section investigated by the field program.

Limited soil sampling was conducted near the chemical sewer in North Plants proper as part of the Task 42 Phase I and Phase II investigations. Two alluvial monitoring wells were installed directly adjacent to the chemical sewer and another was installed downgradient to track potential contamination in the groundwater (Ebasco, 1988b).

The pressure line between the sump 1727 and Manhole 5-4 was assumed not to have leaked. Leaks and breaks in pressurized lines become obvious and are easily identified. No records of broken or leaking pipes have been found for this portion of the line.

Comment 5: Page 36, 3.3 Follow-on Survey.

Since there has been no investigation of the chemical sewer in the North Plants proper, how could it be determined in the Feasibility Study that no additional information is required? Inspection of the chemical sewer system within North Plants,

along with some soil sampling, should be scheduled prior to the design phase. The proposed follow-on work, which only involves further sampling of the MKE trenches, does not address the knowledge gap associated with the chemical sewer system in North Plants proper.

Response: The volume of potentially contaminated soil for the North Plants chemical sewer was based on conservative estimates for contamination that could be associated with the entire chemical sewer, including the segments in North Plants proper. The estimates are based on the "worst-case" extent of contamination found for the South Plants chemical sewer, a system that is older, more deteriorated, and used more frequently than the North Plants system.

The Feasibility Study will use the estimated volume of potentially contaminated soil to screen potential alternatives and reduce the number of alternatives requiring detailed analysis. Following the screening process, if information on the extent and type of soil contamination associated with the North Plants chemical sewer is insufficient to perform detailed analyses of the remaining alternatives, an additional contamination assessment will be conducted. This assessment will be focused to collect only those data needed to fully evaluate the remediation options of choice. The proposed follow-on work presents a program to collect some of this additional information. Refinements and additions to this program can be made after the requirements for the Feasibility Study are determined. Therefore, data to fill the "knowledge gap" will be collected if needed to support the cleanup activities for Rocky Mountain Arsenal.

Comment 6: Page 39, 3.4.

Shell maintains that it is inappropriate to calculate the estimated volumes of potentially contaminated soil prior to the determination of preliminary action levels. In this particular example there is insufficient data to even attempt such a calculation.

Response: The preliminary estimated volume of potentially contaminated soil is intended to provide a worst-case scenario only. An exact determination of the extent of contamination can only be obtained during remediation activities. Thus, this estimate of potentially contaminated soil should provide conservative estimates that are greater than actual values. These estimates provide a preliminary volume estimate for evaluating potential remedial alternatives during the Feasibility Study. The need to refine these estimates will be determined during the Feasibility Study.

Chemical Sewer - South Plants

Comment 1: Page 1, second paragraph.

In the fifth sentence, hydrazine wastes continued to flow through the gravity system to Basin F until 1982.

Response: The text has been changed to reflect this exception to the statement that the Army stopped using the gravity chemical sewer system in the late 1970s.

Comment 2: Page 3, third full sentence.

It should be noted that connections listed in Table CS-SP-1 do not represent any chronology of events. Different buildings were connected and unconnected at different times.

Response: The buildings listed in Table CS-SP-1 are ordered by building number, not by the chronological order of connection or disconnection. A sentence has been added to the text to clarify any misunderstandings concerning information presented in this table.

Comment 3: Table CS-SP-1, page 6.

Activities listed under Buildings 514 and 514A may be reversed. Also, organo phosphate manufacturing should be listed under Building 514.

Response: The building descriptions for Buildings 514 and 514A have been exchanged in Table CS-SP-1. In addition, the description for Building 514 had been expanded to include the manufacture of chlordane and "Strauss Hex" (1947 to 1952), and pesticide production by Shell Chemical Company (1951 to 1981). The organophosphorous pesticides parathion and vapona are included in the list of pesticides manufactured in Building 514.

Comment 4: Page 9, last sentence (which ends on page 10).

The Process Water Distribution System draft Phase I Contamination Assessment Report states that the natural bedrock high in this area may also contribute to the groundwater mound.

Response: The text has been changed to include the natural bedrock high as possibly contributing to the groundwater mound in the South Plants.

Comment 5: Page 12, last paragraph.

"Because these compounds are representative of the class of chemicals typically found in the groundwater beneath the South Plants Manufacturing Complex, their presence in the groundwater

beneath South Plants does not indicate that the sewer line is contributing to groundwater contamination."

This paragraph should be either deleted or by itself should be inserted between not and indicate.

Response: The words "by itself" have been added to the text between the words "not" and "indicate."

Comment 6: Page 13, second paragraph.

Julius Hyman leased facilities at the RMA in the spring of 1947 as did CF&I. In 1949, Julius Hyman assumed a portion of the CF&I lease.

Response: The text has been changed and now states that Julius Hyman and Company leased facilities at the RMA in the spring of 1947 as did Colorado Fuel and Iron. In 1949 Julius Hyman and Company assumed a portion of the Colorado Fuel and Iron lease (RSN001 F 0875).

Comment 7: Page 14, 1942, second paragraph.

Originally, only wastes from the acetylene plant were pumped to the lime settling basins. Wastes from mustard production flowed directly to Basin A, and wastes from lewisite manufacture flowed first to M-1 pits and then to Basin A (RMA, Undated).

Response: The text has been changed to clarify the destination of the noted waste streams.

Comment 8: Page 14, 1942, third paragraph.

Building 331 was also used for M70 burster well renovation which included electrolyte processes involving chromium containing solutions. Waste from that operation was carried to Sand Creek Lateral.

Response: According to the building survey conducted by Ebasco under Task 24, the M-70 burster tube renovation in Building 331 didn't occur until the last quarter of 1952 (Ebasco, 1988b). The paragraph referred to in the comment describes the chemical sewer in 1942, and therefore will not be changed.

Comment 9: Page 15, 1953.

In 1953 acid wastes from dichloro production caused the decomposition of the cement joints (RIA001 0594). The dichlor wastes were temporarily run by an open ditch (RLA002 0498 and RMA060 1933) to Sand Creek Lateral. Ultimately, the chemical sewer line was replaced (RLA002 1514).

Response: The referenced documents have been reviewed and information has been added to both the 1951 and the 1953 descriptions of activities.

Comment 10: Page 18, 1976.

In 1976 a new VCP sewer line from the laundry and lab was constructed across "D" Street and connected to the original caustic line that discharged to Basin F.

Response: The text has been changed to include the addition of this line. Field observations by Ebasco personnel show that the pipe is concrete, not VCP.

Comment 11: Page 19, 1980.

The new overhead system was completed in early 1982.

Response: The MKE Interim Report: Phase I of Rocky Mountain Arsenal Sewer Investigations was consulted to verify this date, but the information was not found. The text will not be changed unless a reference is located.

Comment 12: Page 21, first sentence.

Numerous investigations of the chemical sewer system also occurred in the late 1970's.

Response: The Rocky Mountain Arsenal Information Center catalog was reviewed to identify relevant studies. Without specific report titles or source organizations, additional information will not be added to the chemical sewers report.

Comment 13: Page 21, first full paragraph.

Parsons in 1954 also investigated the source, volume and composition of the industrial wastes generated at the RMA

Response: Information from a 1955 Parsons report has been added to the text. No other reports by Parsons were found.

Comment 14: Page 100, Figure CS-SP-61.

This is a VCP, not concrete pipe.

Response: Field observations by Ebasco personnel have determined that this section of pipe is concrete.

Comment 15: Page 158, Manhole 6-1.

Tetrachloroethane was the solvent used for removing impregnate from 1943-1964. Tetrachloroethane readily hydrolyzes to trichloroethanes. The presence of these substances may be attributable to the laundry.

Response: As stated in Section 2, History, in 1957 Buildings 314 (the laundry) and 313 (the lab) were connected to the chemical sewer by a lateral going east to Manhole W21. It wasn't until 1976 that the Army ran a lateral from these two buildings west to Manhole 6 in the old chlorine plant area (MKE, 1986). This included construction of Manholes 6-1, 6-2, 6-3, and 6-4. Wastes from the laundry didn't flow through Manhole 6-1 until 12 years after the Army had stopped removing the impregnate from protective clothing with the solvents found beneath Manhole 6-1.

The paragraph under consideration will not be changed. An entry has been added to the history section to include the changes made in 1976, as requested in Comment 10.

Comment 16: Plate CS-SP-1

The manholes immediately south and slightly west of the western-most Section 36 lime basin are not correctly shown. Only one manhole exists here, and it is believed to be on the original 30" line to Basin A. The 30" line is shown on the map as removed, which is incorrect. This line is the only sewer north of December 7th Avenue that is still in place. MKE has observed that it is flooded due to its being plugged at its discharge point by the second lime basin.

Response: Field investigations by Ebasco have verified the configuration of the chemical sewers in this area (Gabel, 1987). Plate CS-SP-1 has not been changed.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII

999 18th STREET - SUITE 500
DENVER, COLORADO 80202-2405

MAY 16 1988

Ref: 8HWM-SR

Colonel W. N. Quintrell
Program Manager
AMXRM-EE Department of the Army
U.S. Army Toxic and Hazardous Materials Agency
Building 4460
Aberdeen Proving Ground, Maryland 21010-5401

Re: Rocky Mountain Arsenal, (RMA),
Task 10, Chemical Sewers, North
Plants and South Plants, Draft
Final Phase I Contamination
Assessment Report, February, 1988.

Dear Colonel Quintrell:

We have reviewed the above referenced report and have the
enclosed comments from our contractor. Our contact on this
matter is Mr. Connally Mears at (303) 293-1528.

Sincerely yours,

A handwritten signature in cursive script, appearing to read "Connally Mears", is written above the typed name.

Connally Mears
EPA Coordinator
for Rocky Mountain Arsenal Cleanup

Enclosure

cc: Thomas P. Looby, CDH
David Shelton, CDH
Lt. Col. Scott P. Isaacson
Chris Hahn, Shell Oil Company
R. D. Lundahl, Shell Oil Company
Thomas Bick, Department of Justice
David Anderson, Department of Justice
Preston Chiaro, EBASCO

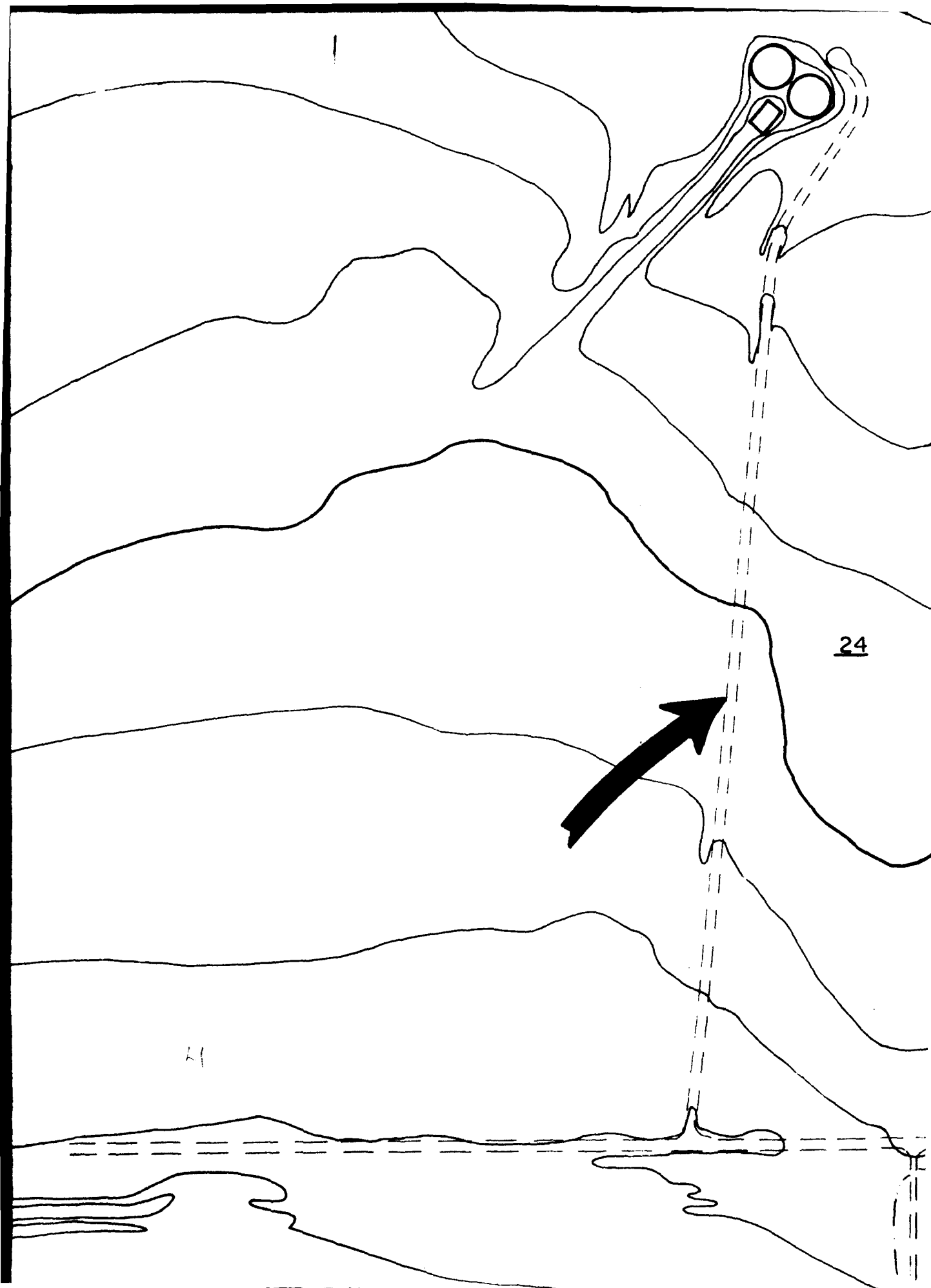
RESPONSES TO COMMENTS OF
U.S. ENVIRONMENTAL PROTECTION AGENCY ON
DRAFT FINAL CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS AND SOUTH PLANTS

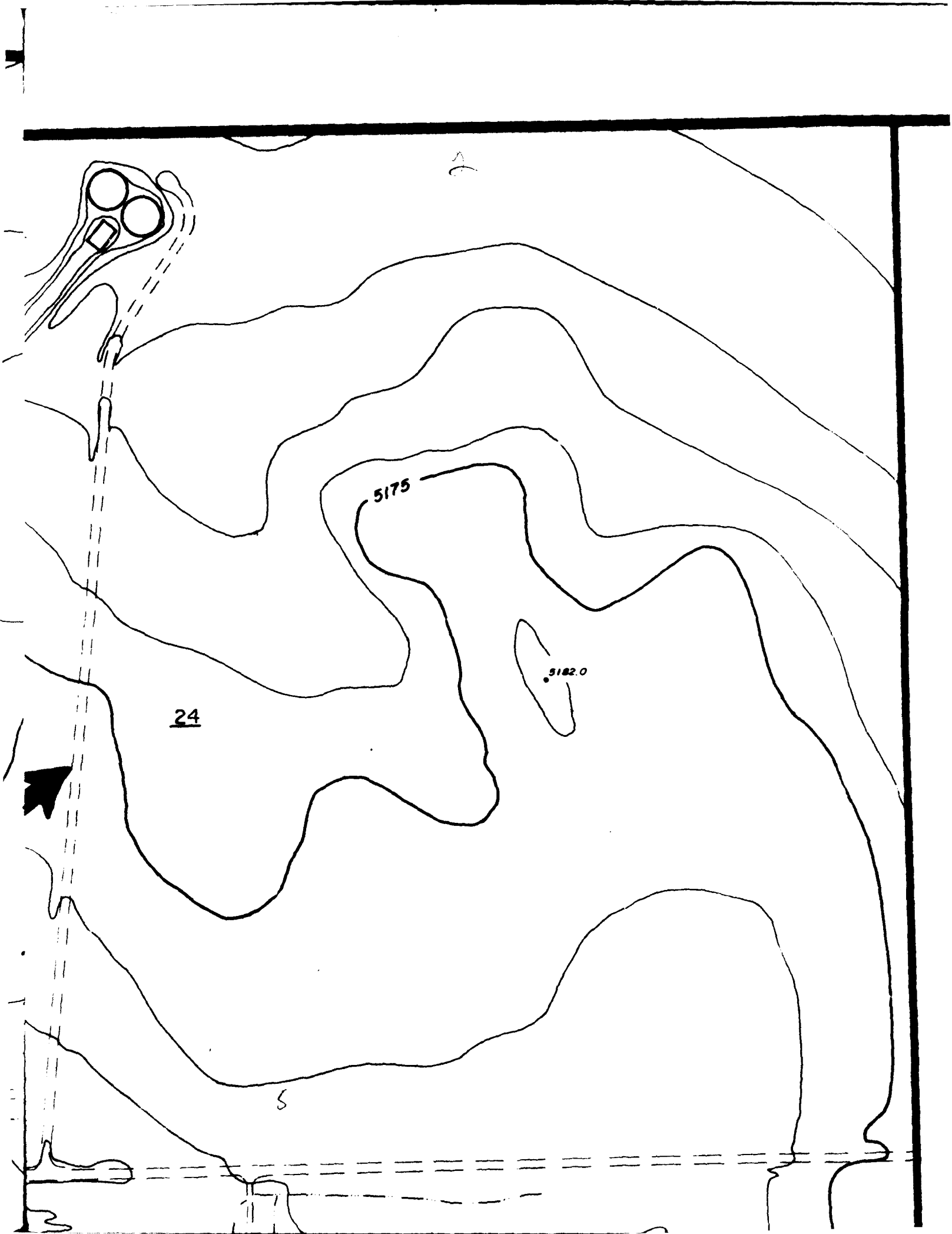
Comment 1: Page 9, first sentence and page 34, last paragraph.
It is stated that pesticide related compounds probably are not related to North Plants operations. However, in Trench MKE 22, aldrin was detected at a concentration of 0.64 ug/g directly underneath the pipe. This indicates that pesticides may have exfiltrated from the chemical sewer. We recommend that the source of these pesticides be investigated during the RMA Feasibility Study (page 36, first paragraph); for example, the potential for contamination of soil from a process water source should be investigated. We also recommend that the maximum depth of contamination underneath the pipe be determined at this same time.

Response: Aldrin was detected in one sample collected by MKE but was not confirmed in samples collected by Ebasco at the same location. A follow-on investigation has been recommended if the Feasibility Study determines that additional information on the presence of potential contamination is needed. The recommended follow-on work includes additional sampling 1 ft and 5 ft from the pipe and extending to the water table. Samples collected as part of the follow-on work will be analyzed for most of the Phase I analytes, including semivolatile organics, the method that detects aldrin. If the recommended follow-on work is undertaken, the extent of potential contamination beneath the pipe will be redefined and the presence of analytes detected in the initial sampling program will be verified.

**RESPONSES TO COMMENTS OF
THE COLORADO DEPARTMENT OF HEALTH ON
DRAFT FINAL CONTAMINATION ASSESSMENT REPORT
CHEMICAL SEWERS - NORTH PLANTS AND SOUTH PLANTS**

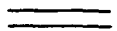
No comments have been received.



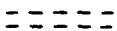


Legend

Building, Existing



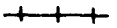
Road, Paved



Road, Unpaved

24

Section Number



Railroad



Sewer Main, with Size



Manhole, with Number

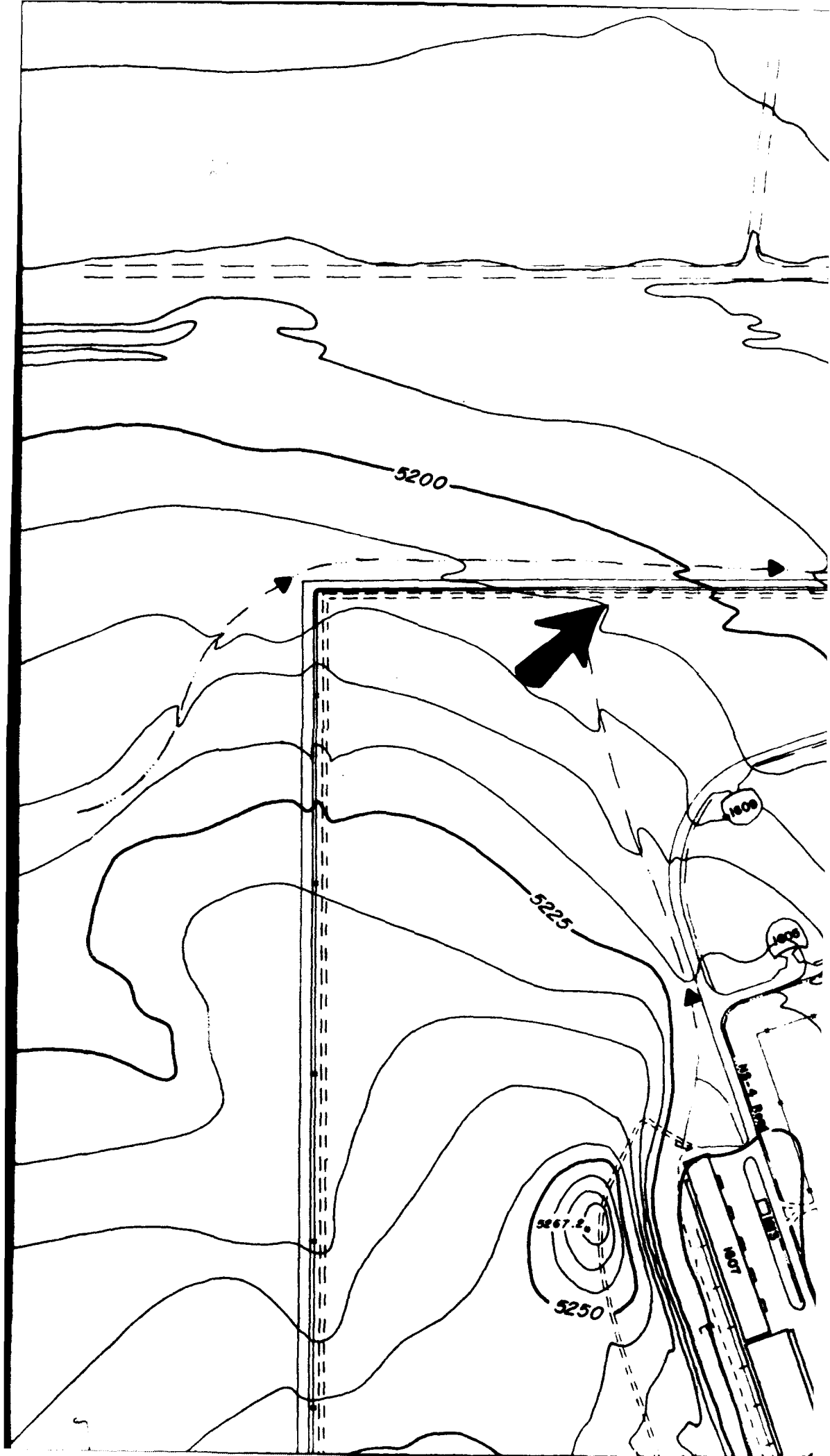


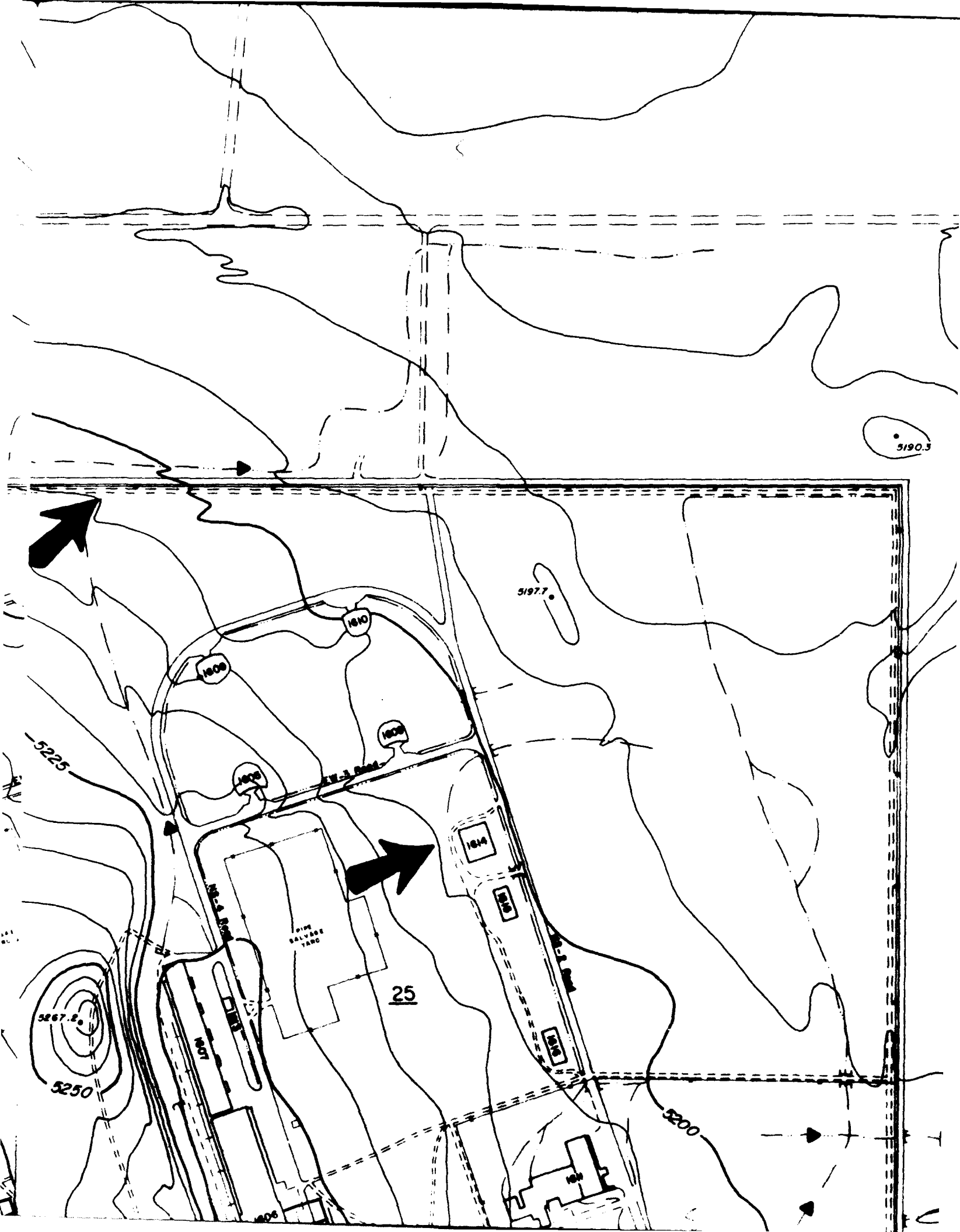
Pumping Station



Plugged Line

Stream or Ditch and Direction
of Water FlowPredominant Direction of
Surface Water Flow





■ Pumping Station

[— Plugged Line

↙ Stream or Ditch and Direction
of Water Flow

↖ Predominant Direction of
Surface Water Flow

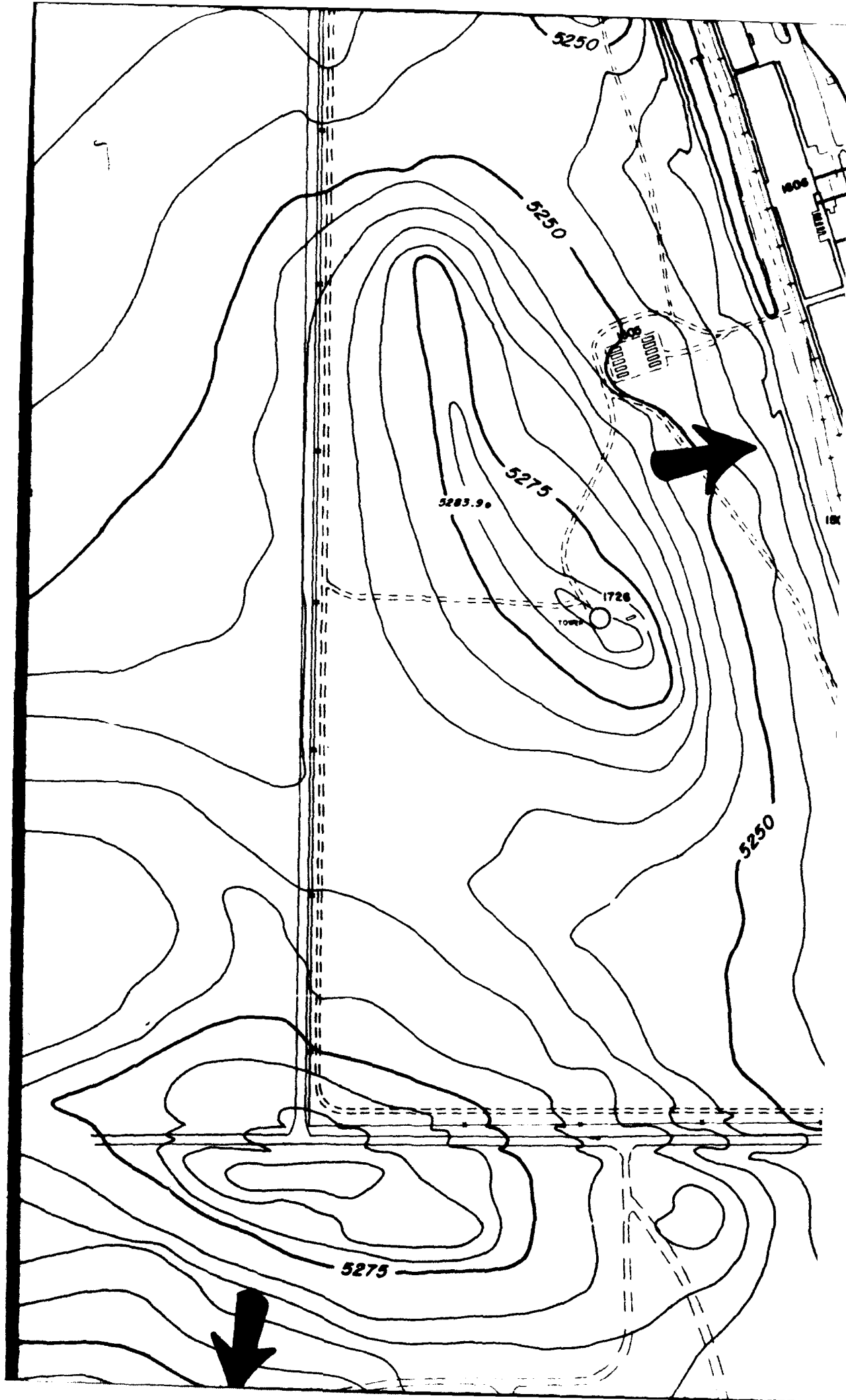
5175 Ground Elevation Above Mean
Sea Level

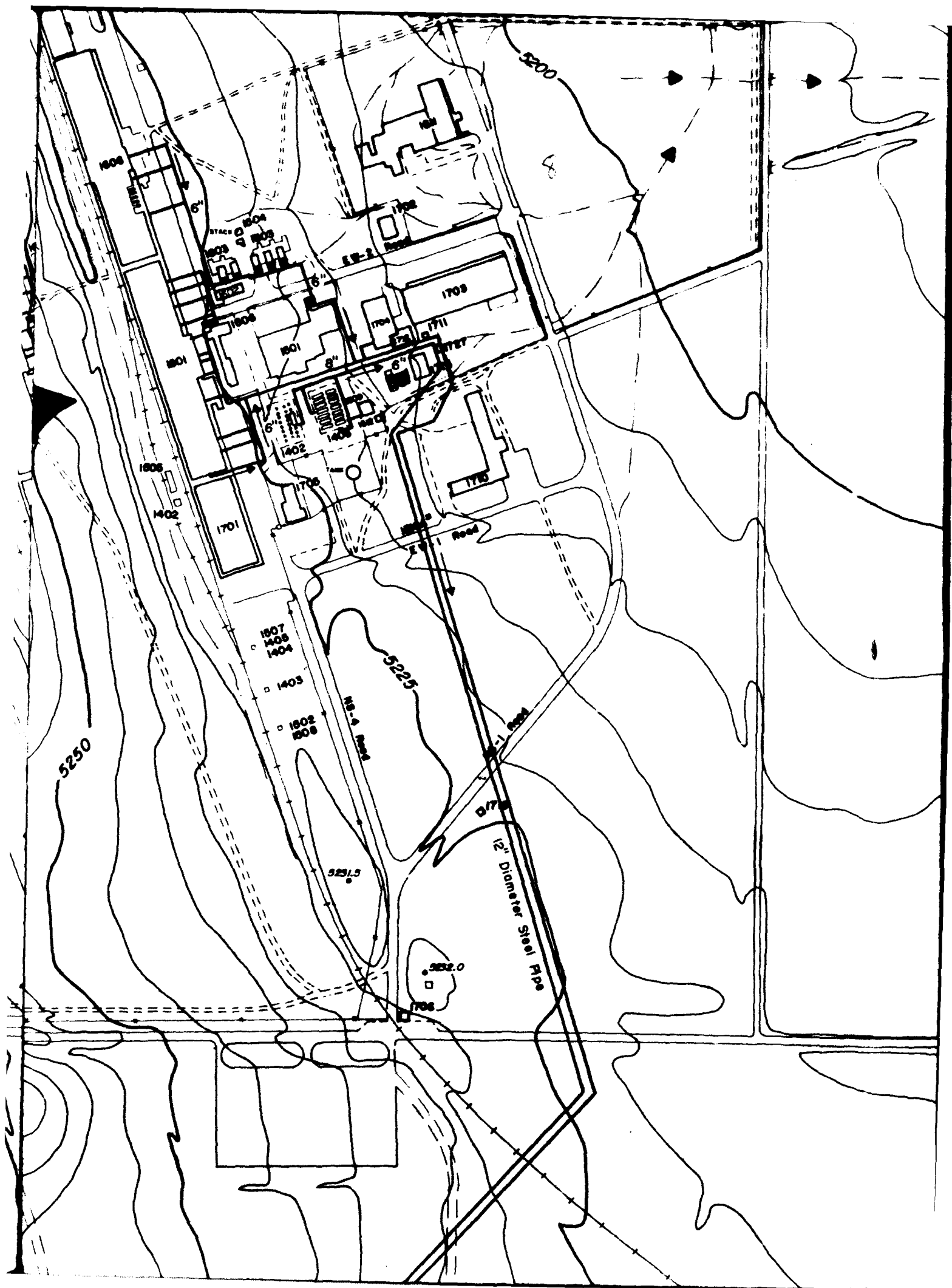
← Direction of Flow within
Sewer Line

—*—*— Fence

Contour Interval is 5 Feet

Note : All piping is cast iron unless
otherwise noted.

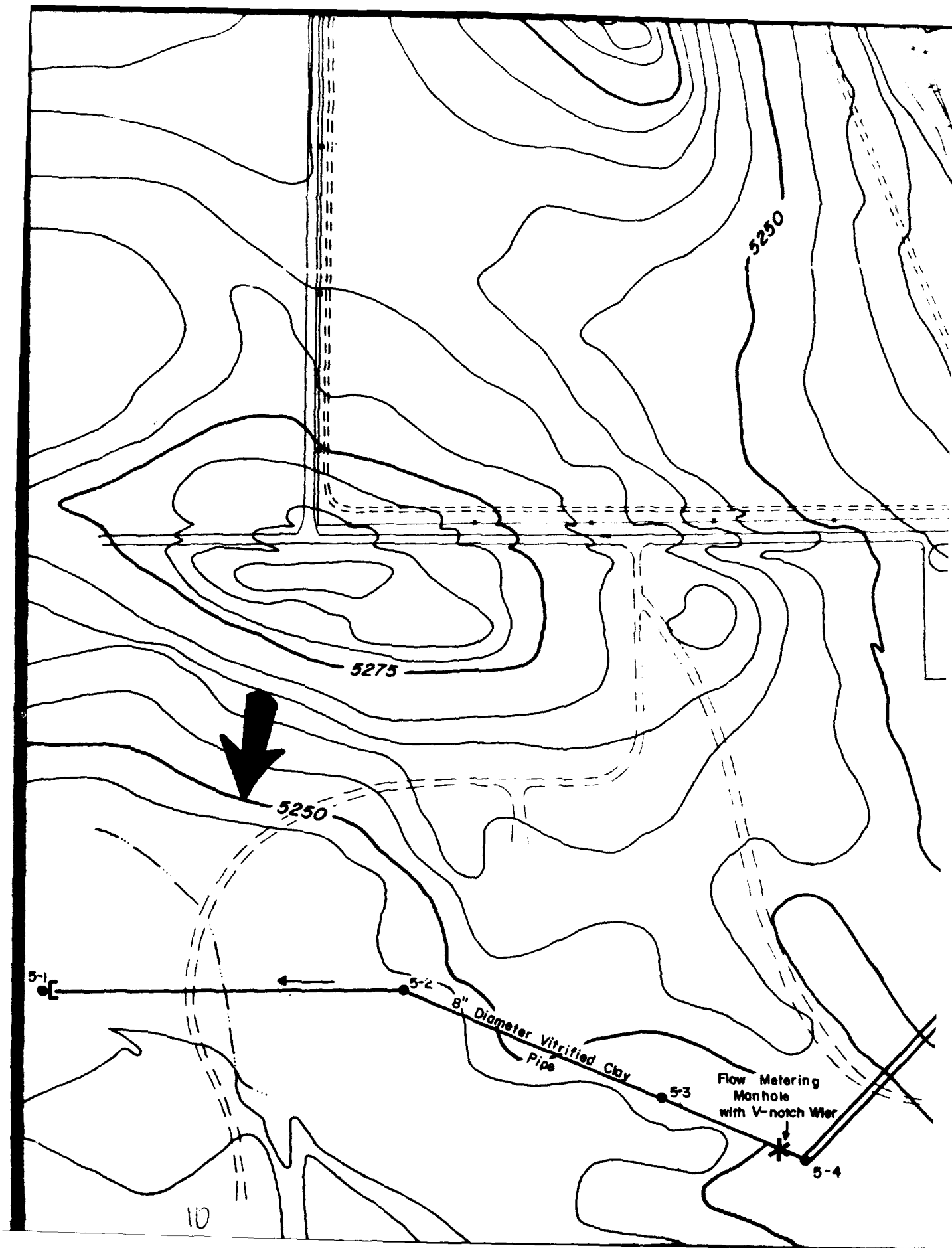


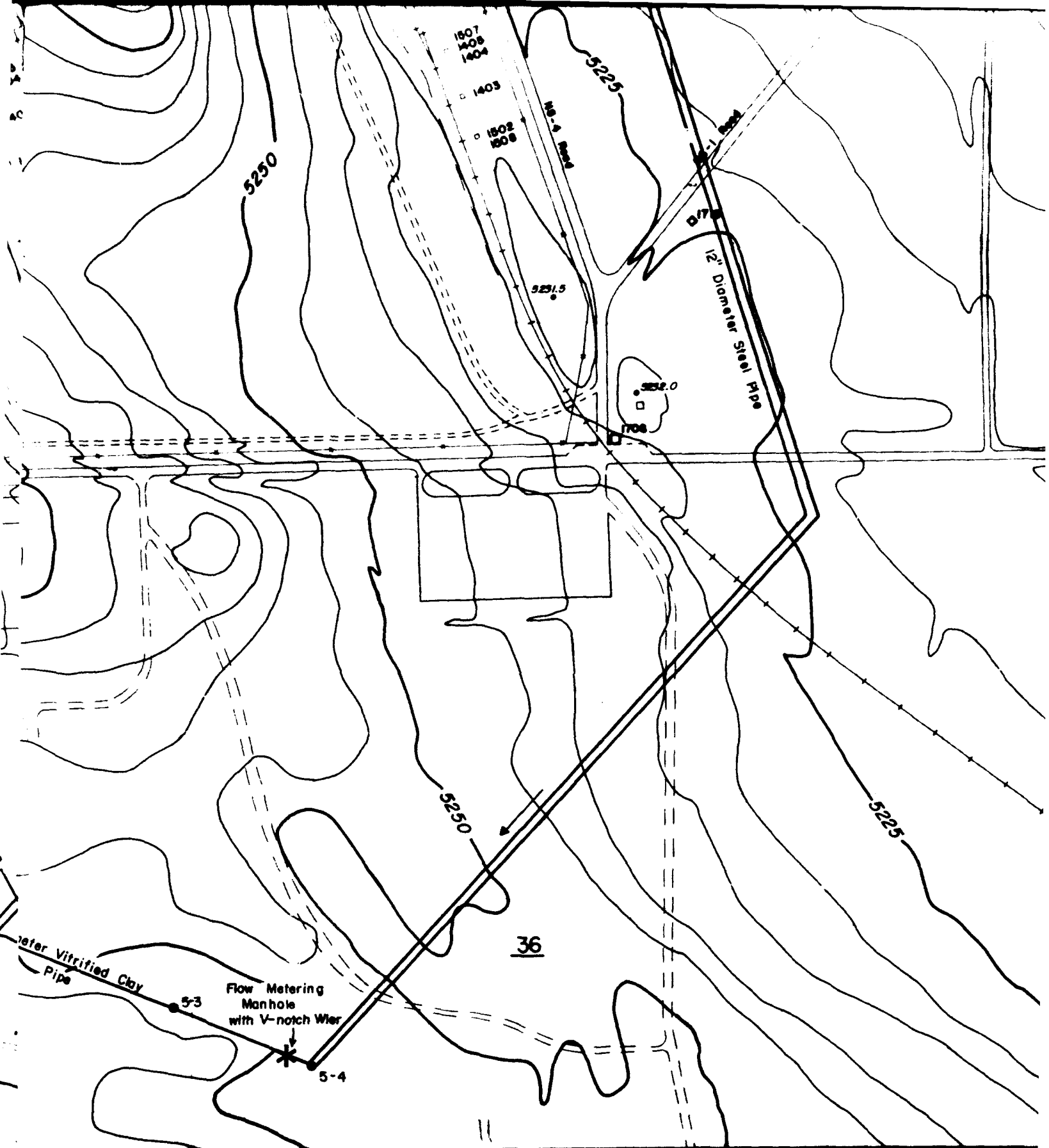




Prepared for :

Program Manager's Office for







Prepared for :

**Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland**

Drafted: 12/8/87

PLATE CS-NP-2

Topography and Surface Drainage

Rocky Mountain Arsenal, Task 10

Prepared by : Ebasco Services Incorporated

1

8

24

4

2



24



6"



5-4 •



24

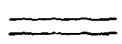
5

3

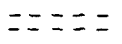
Legend



Building, Existing



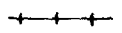
Road, Paved



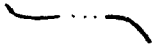
Road, Unpaved

24

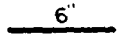
Section Number



Railroad



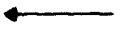
Ditches



Sewer Main, with Size



Plugged Line



Arrow Indicates Direction of Flow

5-4●

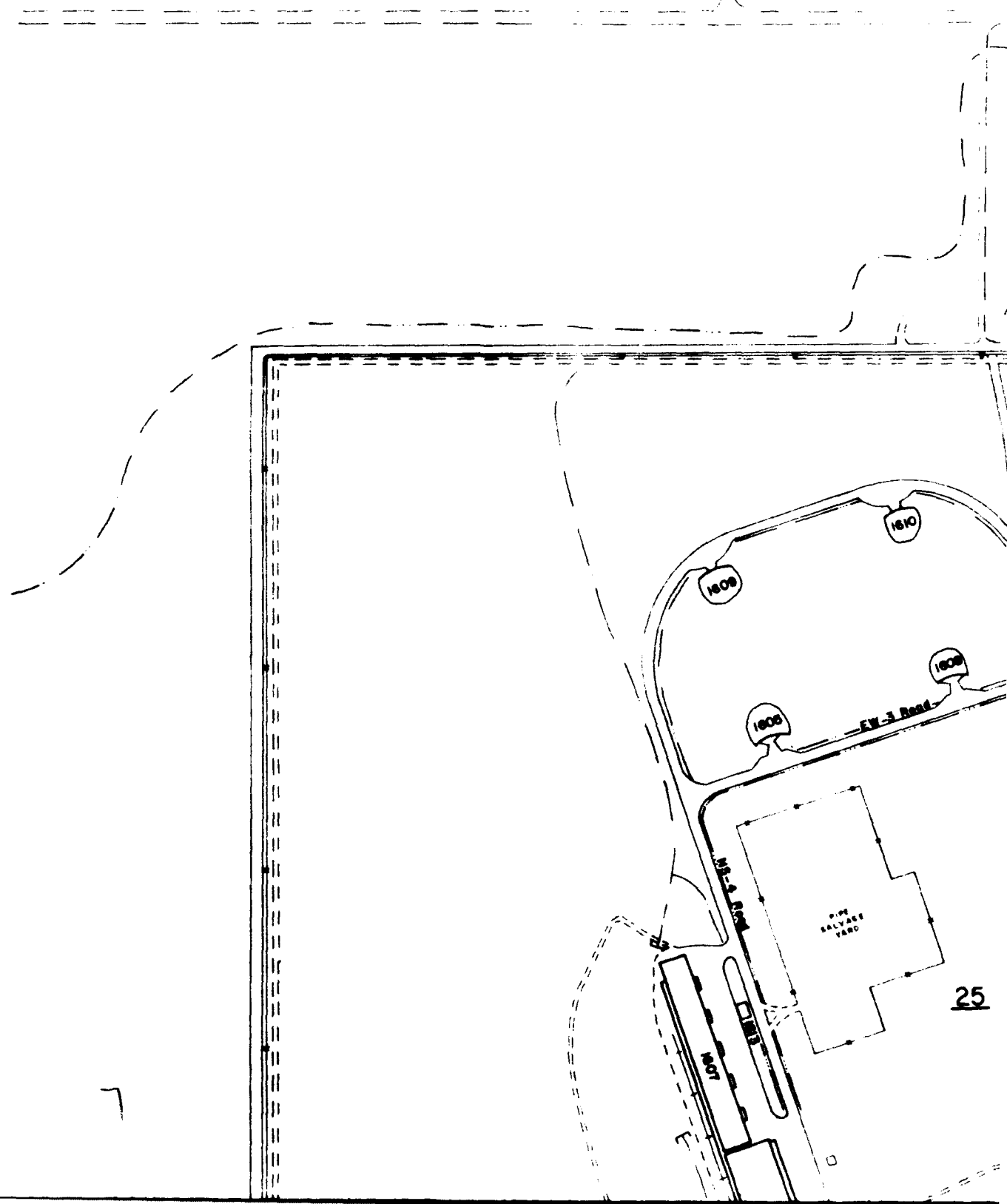
Manhole, with Number



Manhole Inspected During Survey

6

4



 Sewer Main, with Size


 Plugged Line

 Arrow Indicates Direction of Flow

 Manhole, with Number

 Manhole Inspected During Survey

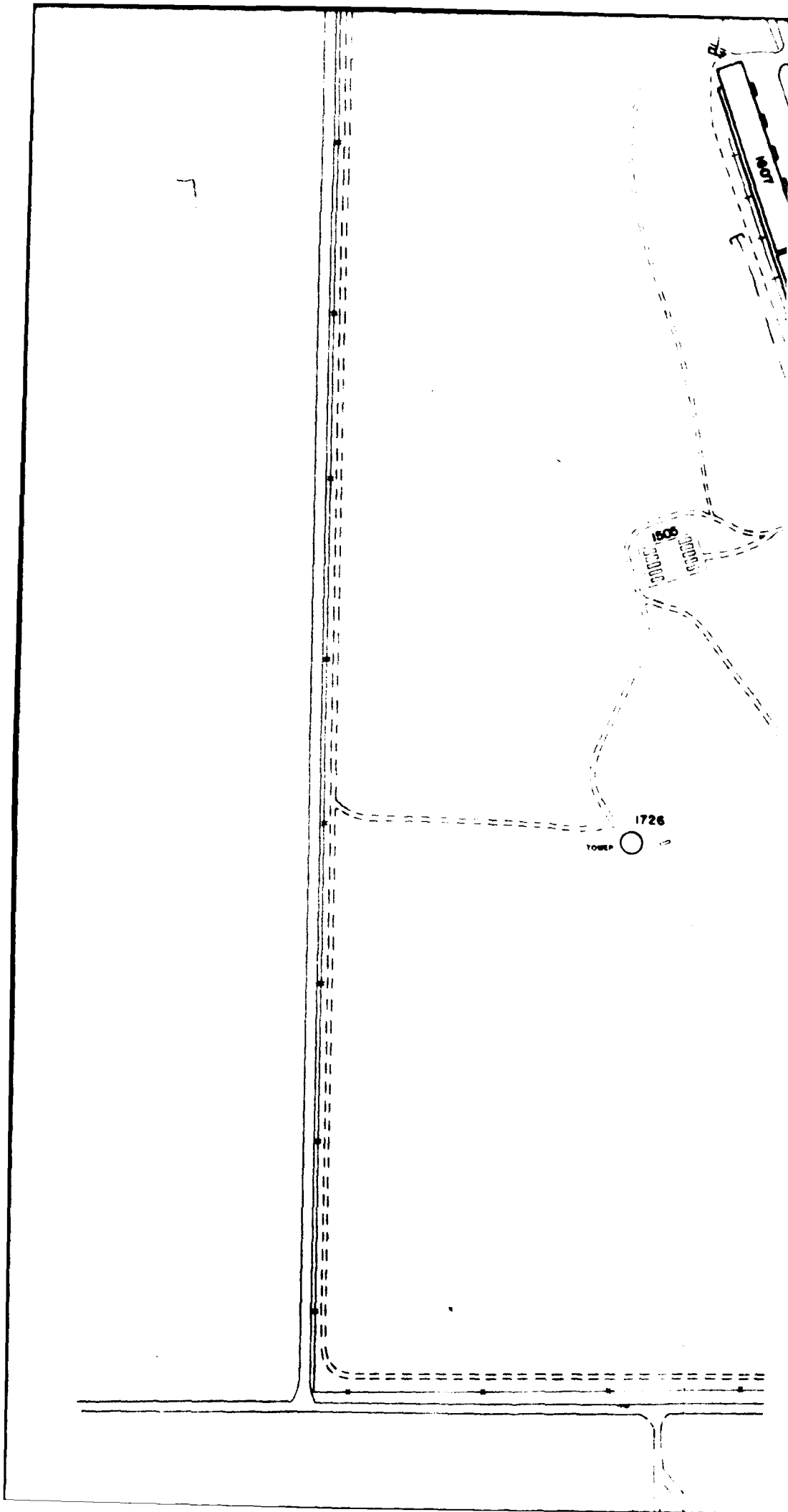
 Pumping Station

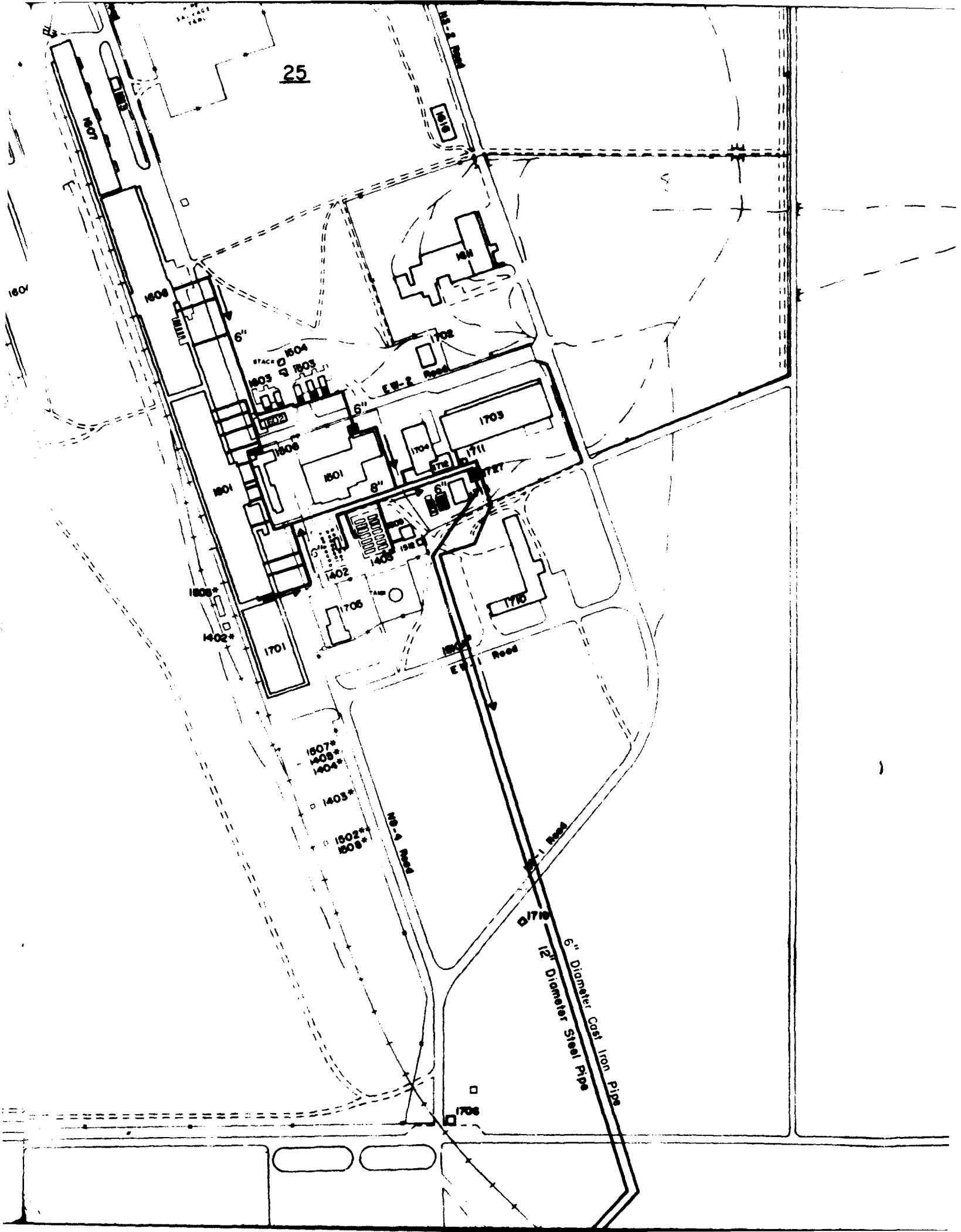
 Fence

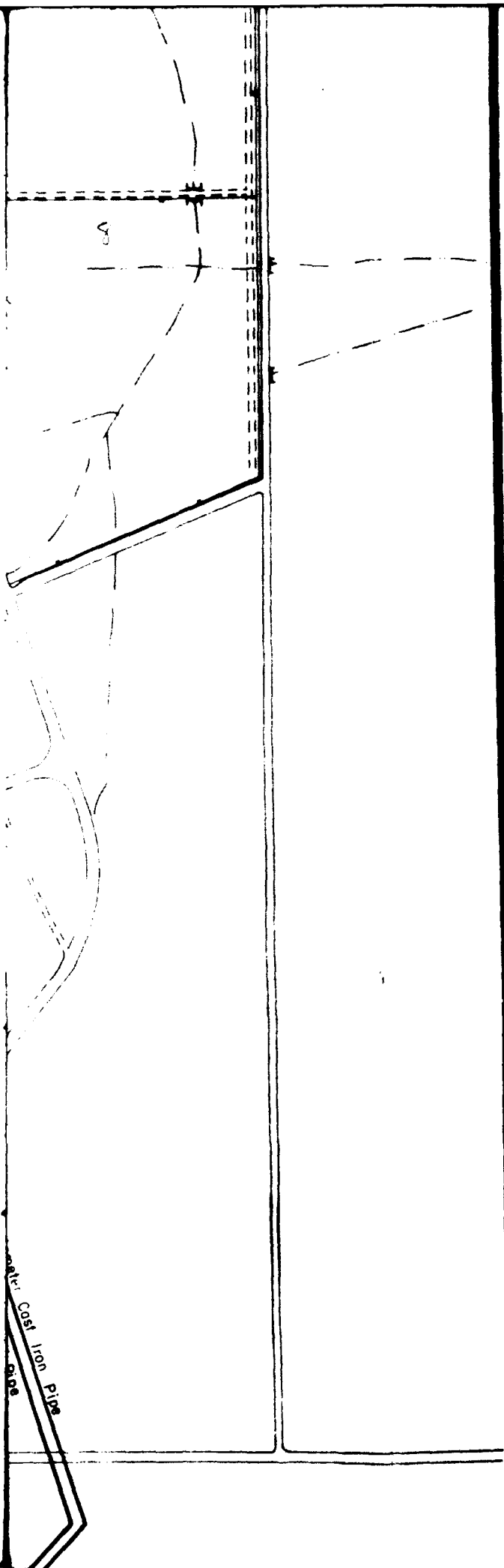
 Trench

 Loading Dock

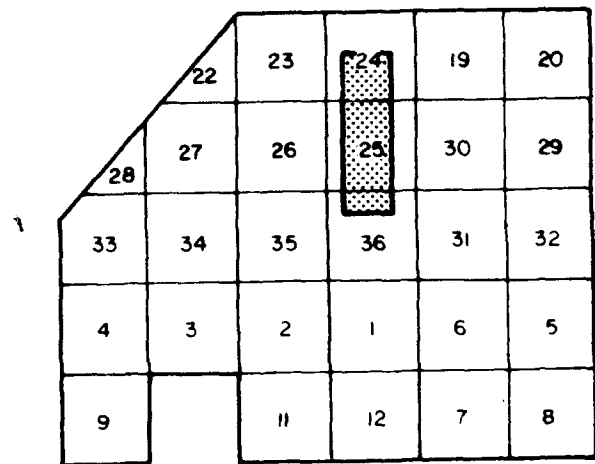
Note : All piping is cast iron unless otherwise noted.



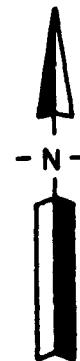


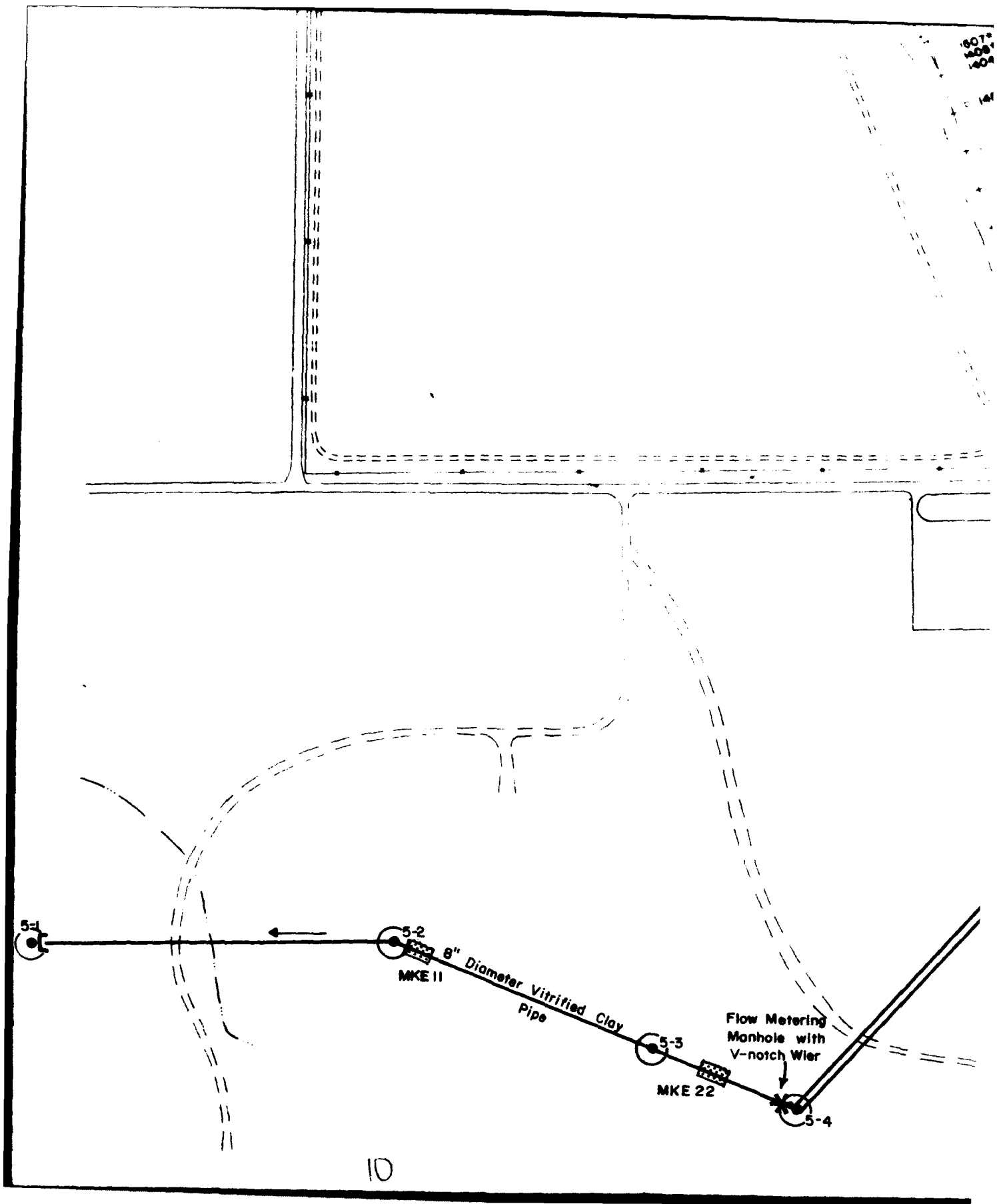


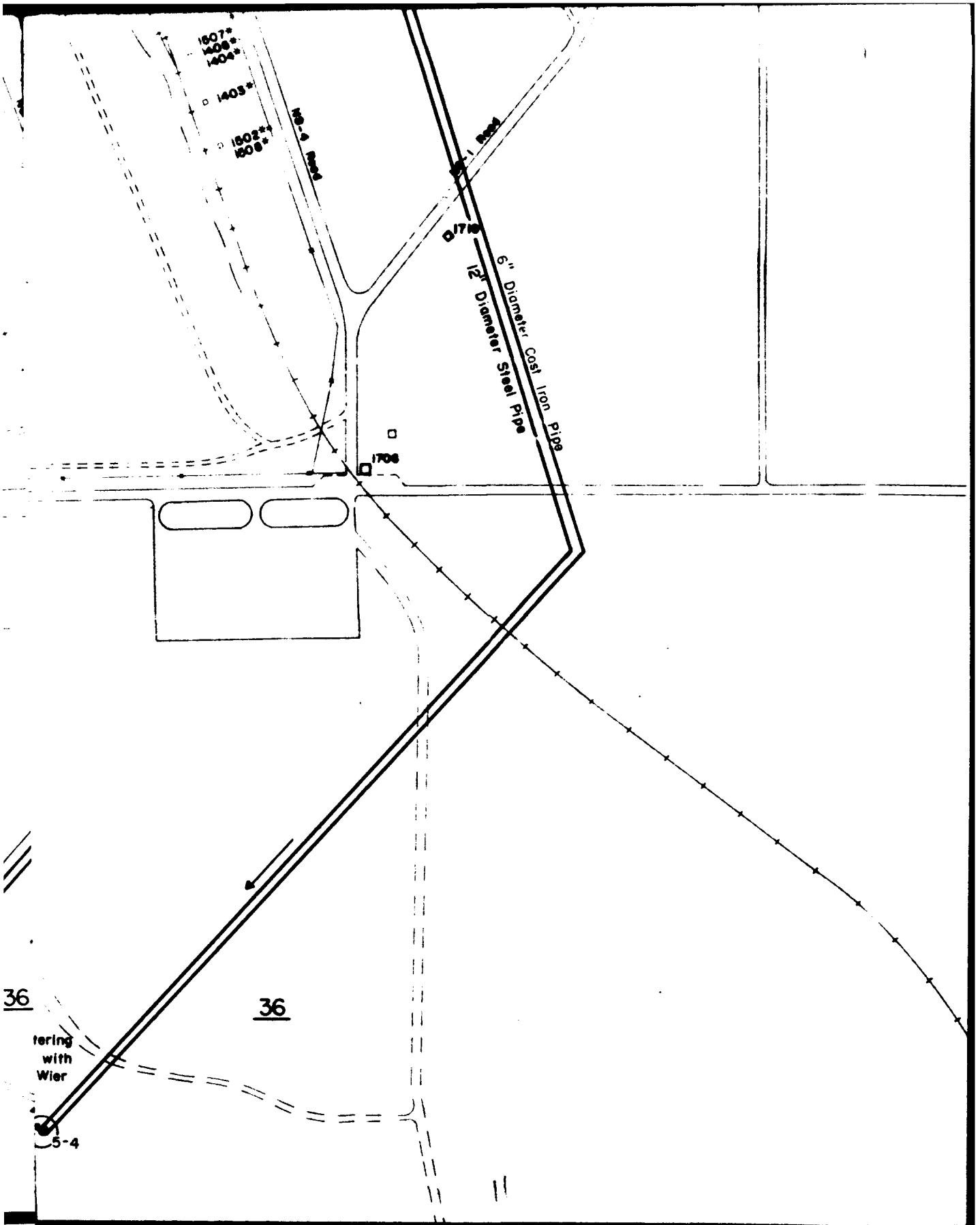
ROCKY MOUNTAIN ARSENAL LOCATION

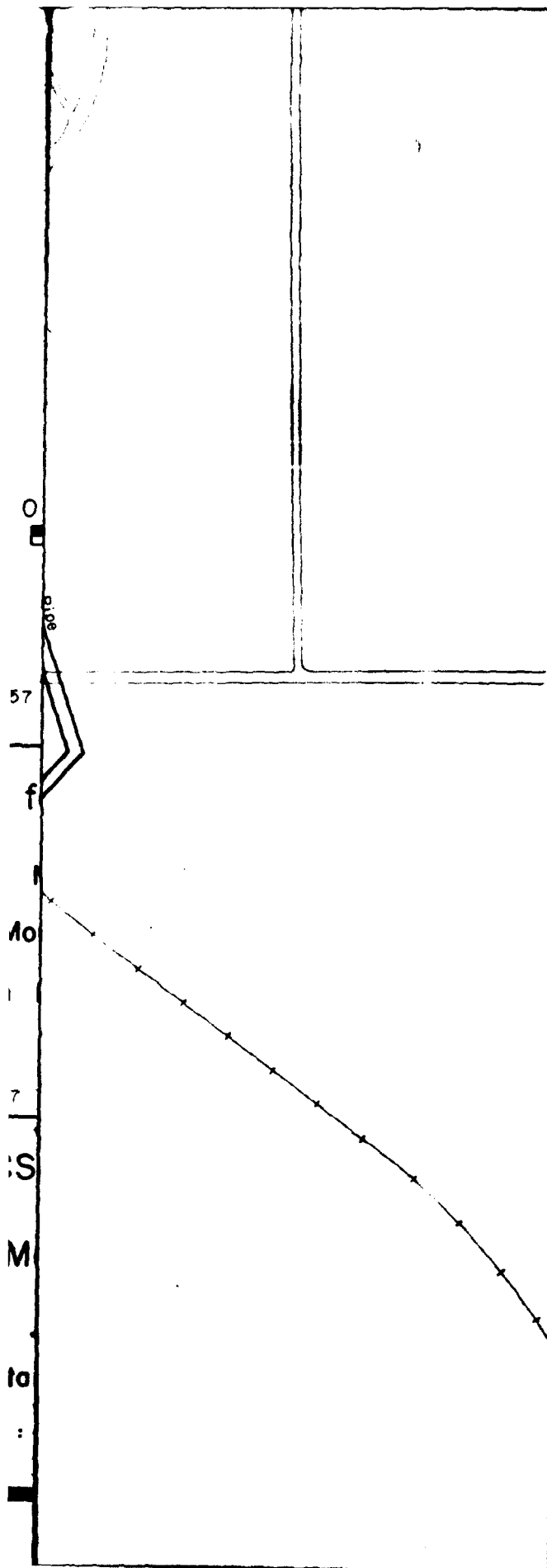


1" = 2 MILES

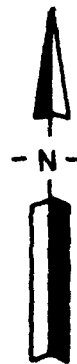








1" = 2 MILES



After: COE, 1957

Prepared for :

**Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland**

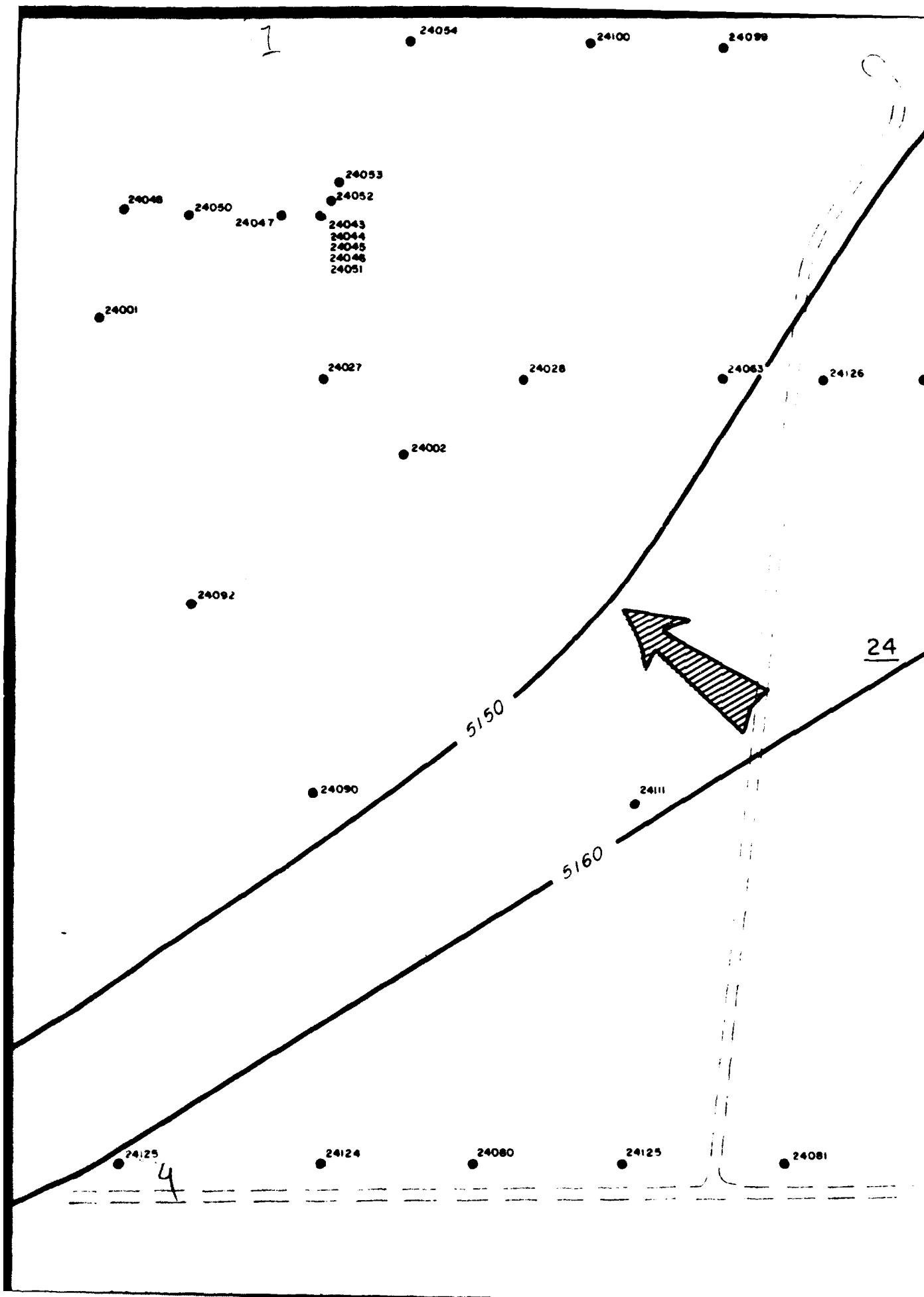
Drafted: 12/9/87

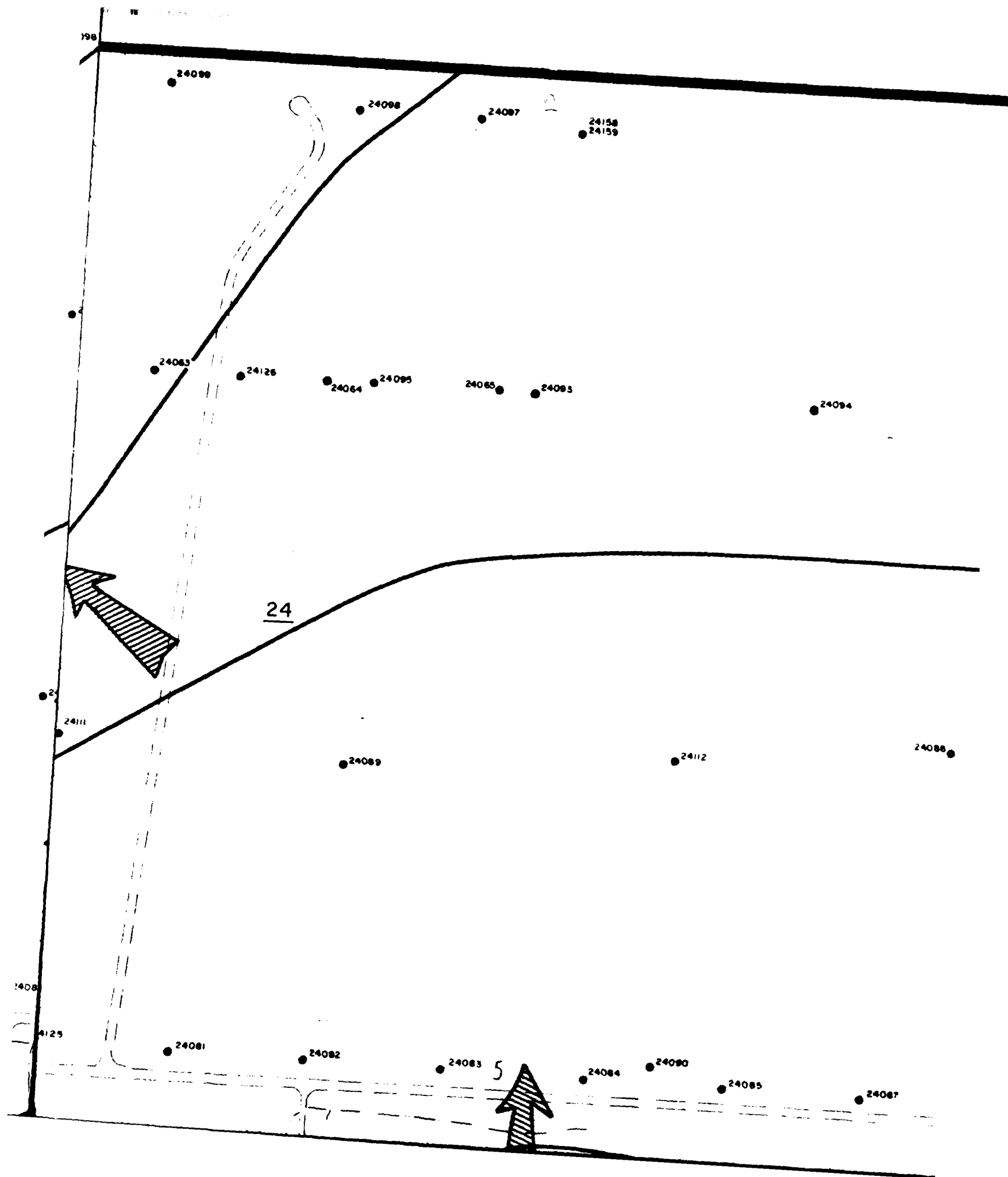
PLATE CS-NP-1

**Vicinity Map Showing Sampling
Locations**

Rocky Mountain Arsenal, Task 10

Prepared by : Ebosco Services Incorporated

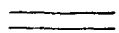




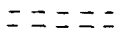
Legend



Building, Existing



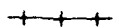
Road, Paved



Road, Unpaved

24

Section Number



Railroad



Sewer Main, with Size



Manhole, with Number



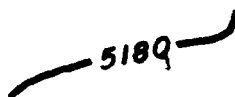
Pumping Station



Monitoring Well



General Direction of Groundwater
Flow



Water Table Elevation

425

24:24

24080

24125

5170

25030
25031

2503.5

5180

25008
25009
25010

25009

25010

25032
25033
25034

25033

25034

100

5190

081

25

24081

24082

24083

5

24084

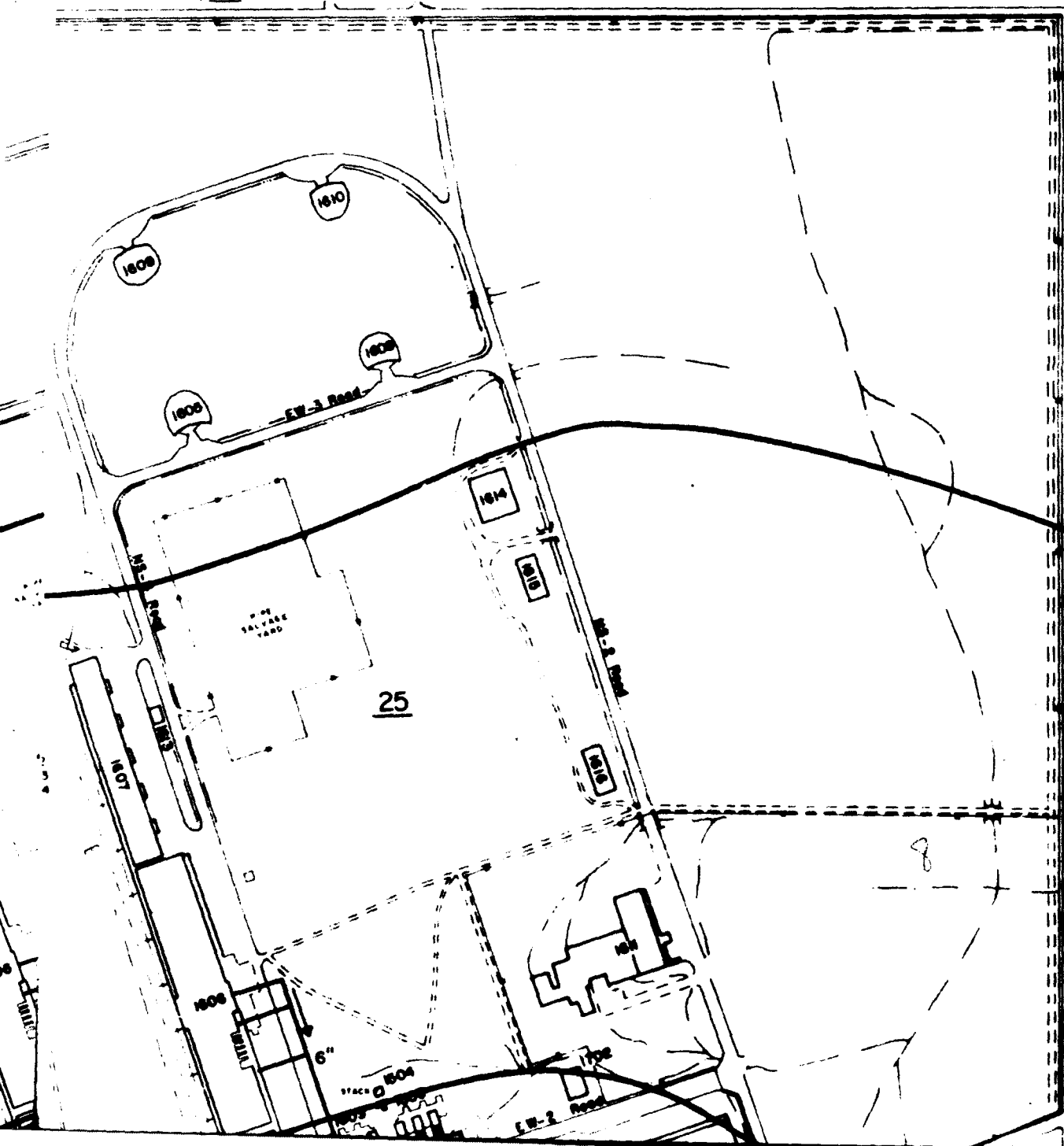
24090

24085

24087

250
250
250

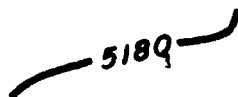
25018
25019
25020



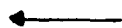
Monitoring Well



General Direction of Groundwater Flow



Water Table Elevation



Direction of Flow within
Sewer Line

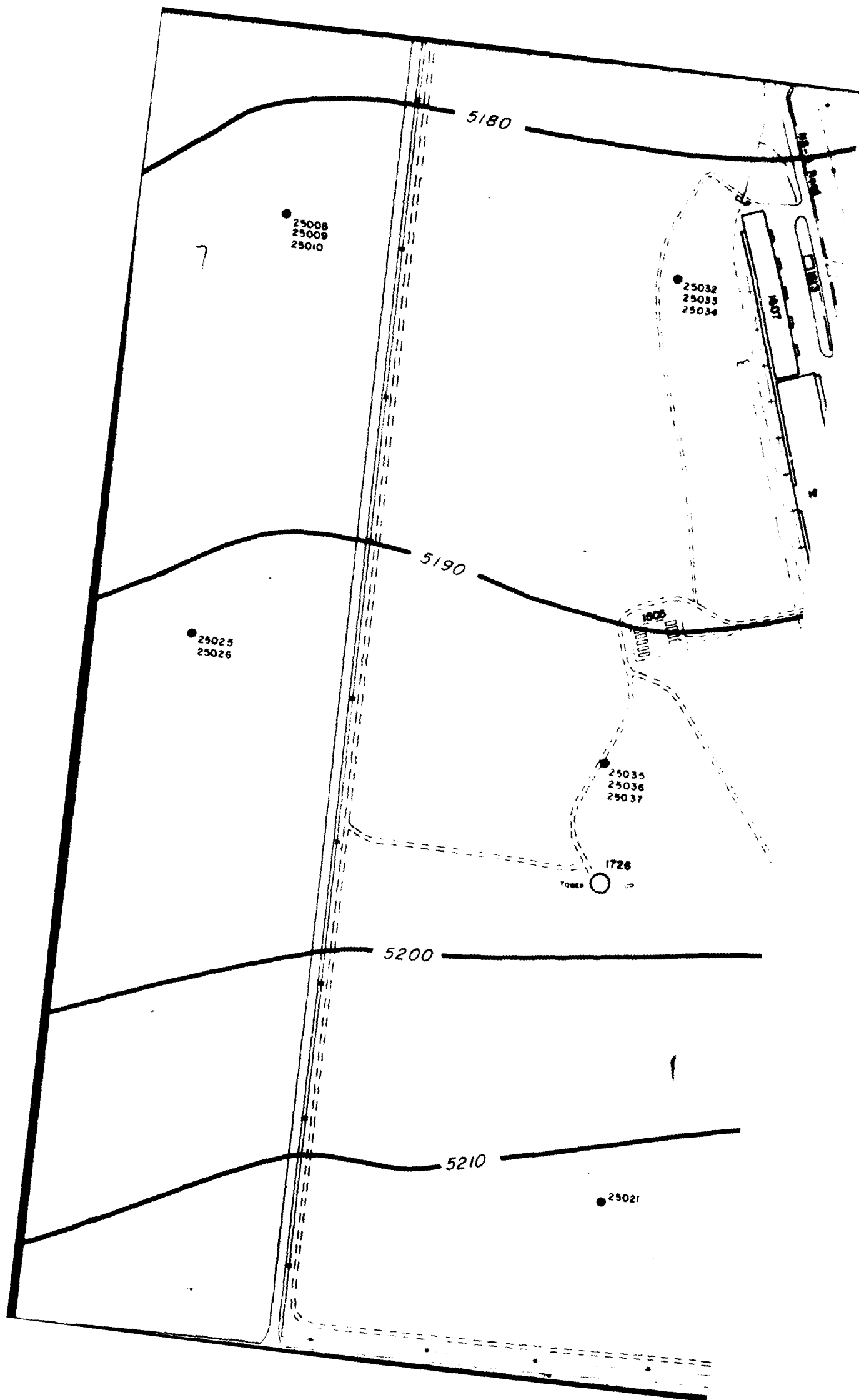


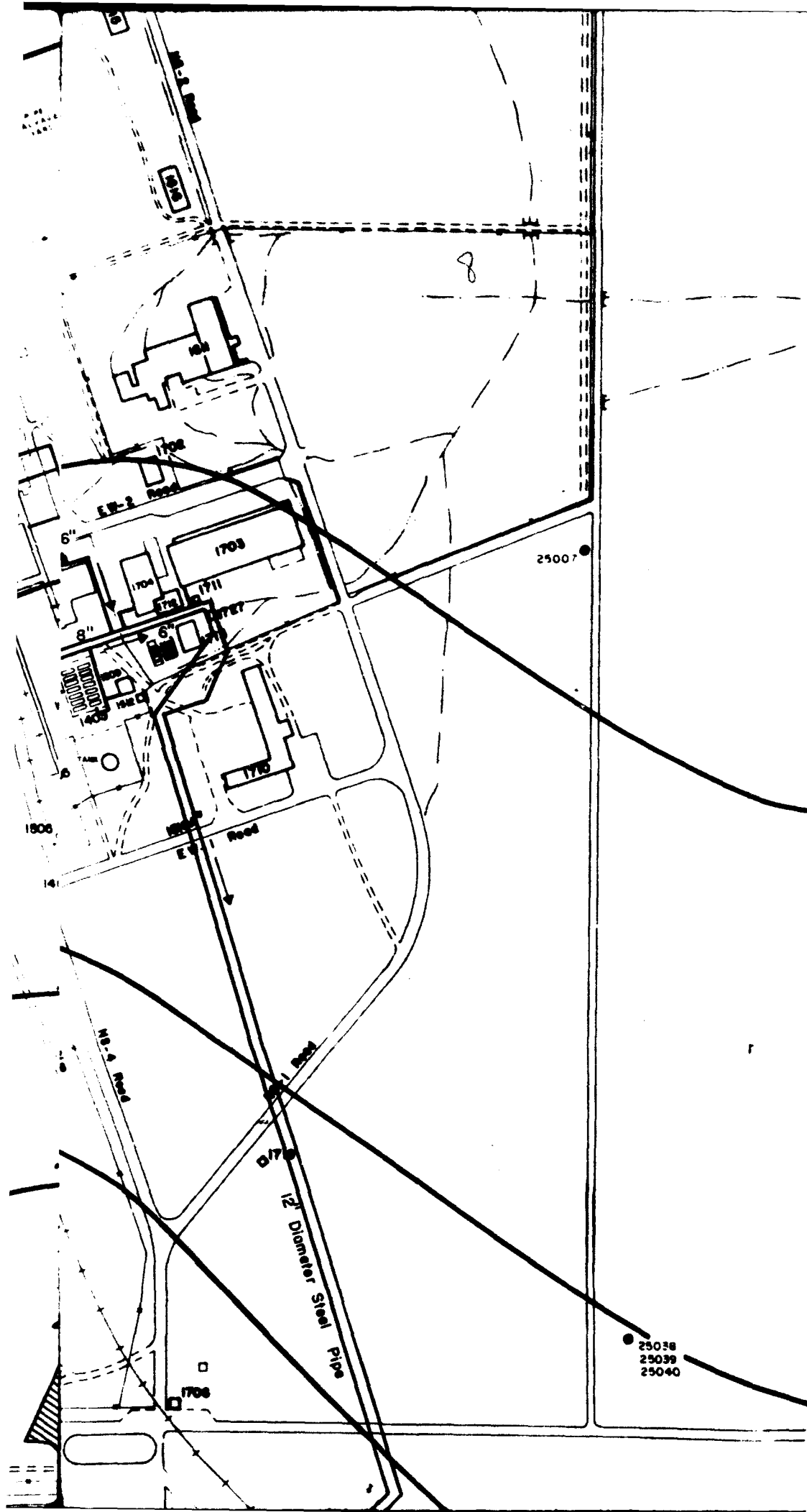
Plugged Line



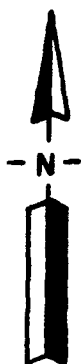
Fence

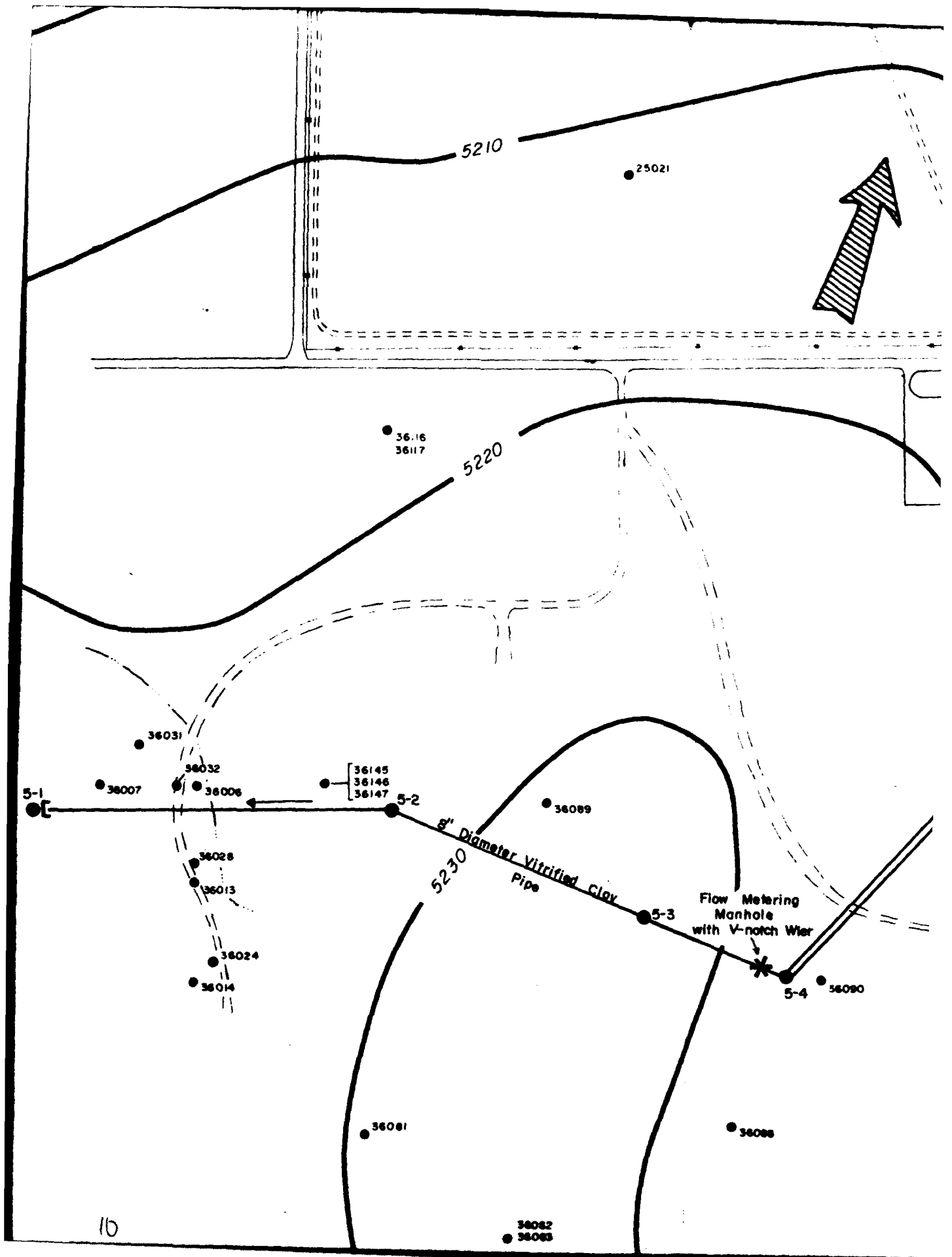
Note : All piping is cast iron unless
otherwise noted.

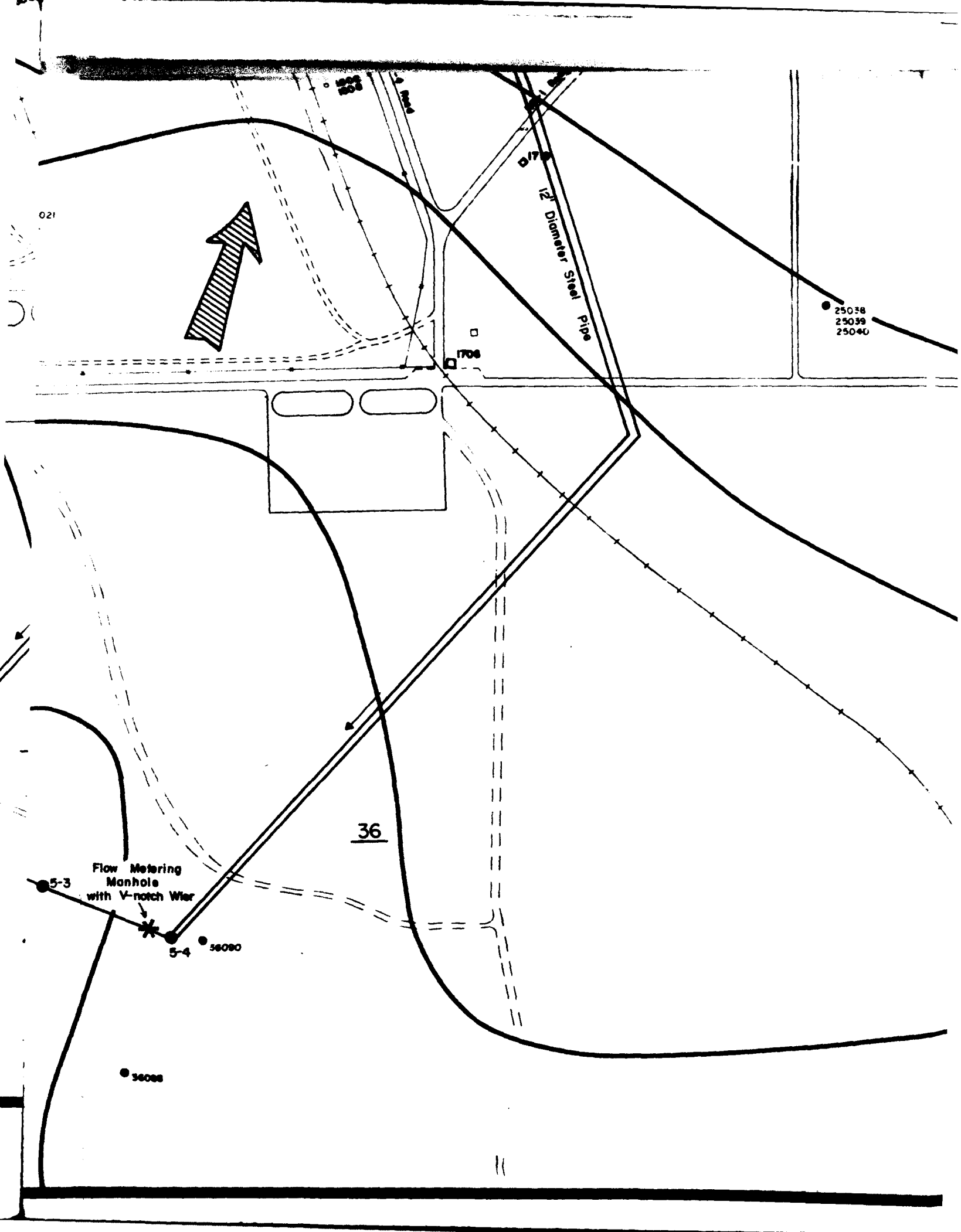




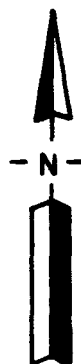
9







25038
25039
25040



0 300 600
FEET

After : ESE, 1986b Water Table Elevation, Alluvial Aquifer Map,
March 1986

Prepared for :

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

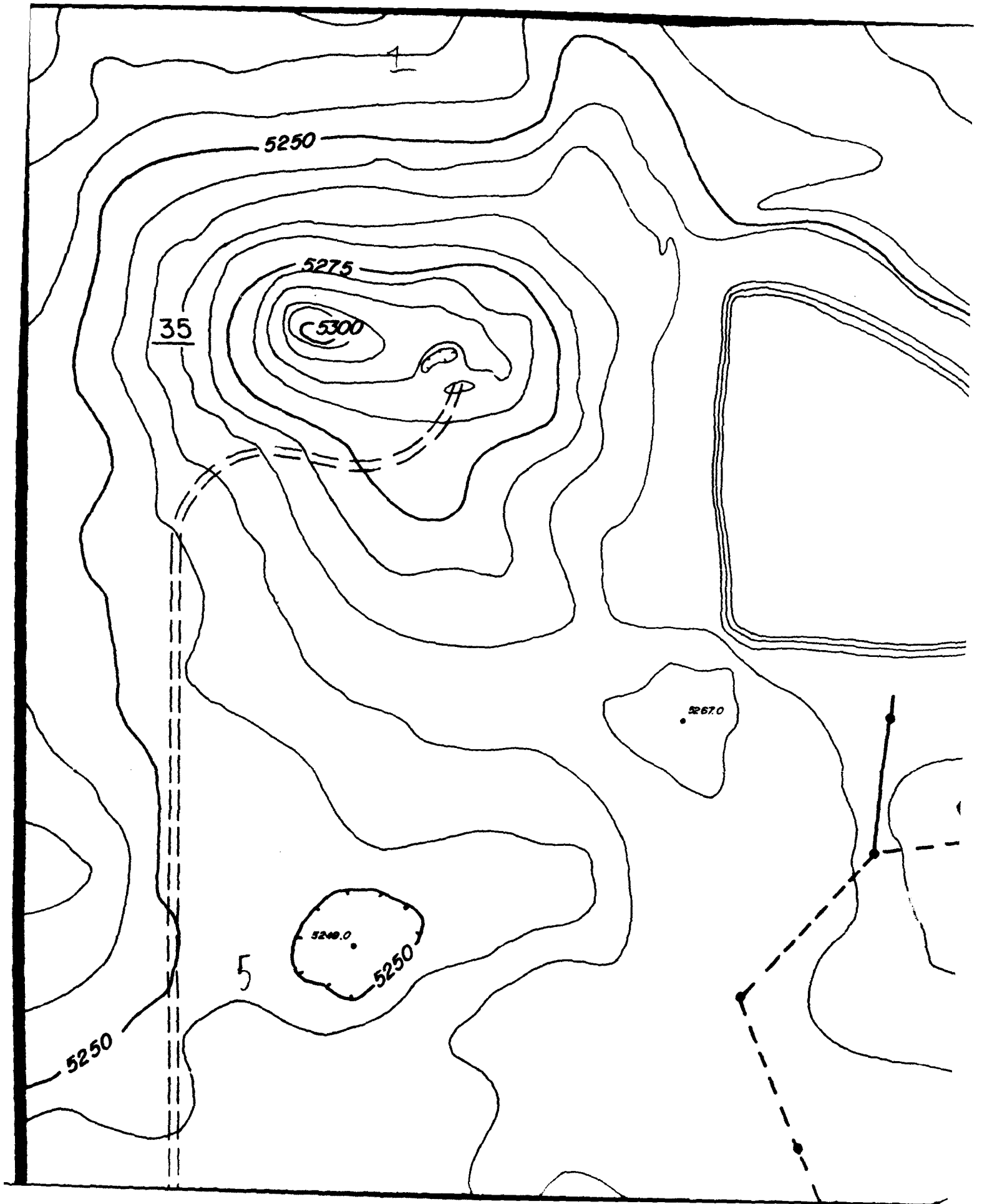
Drafted: 12/15/87

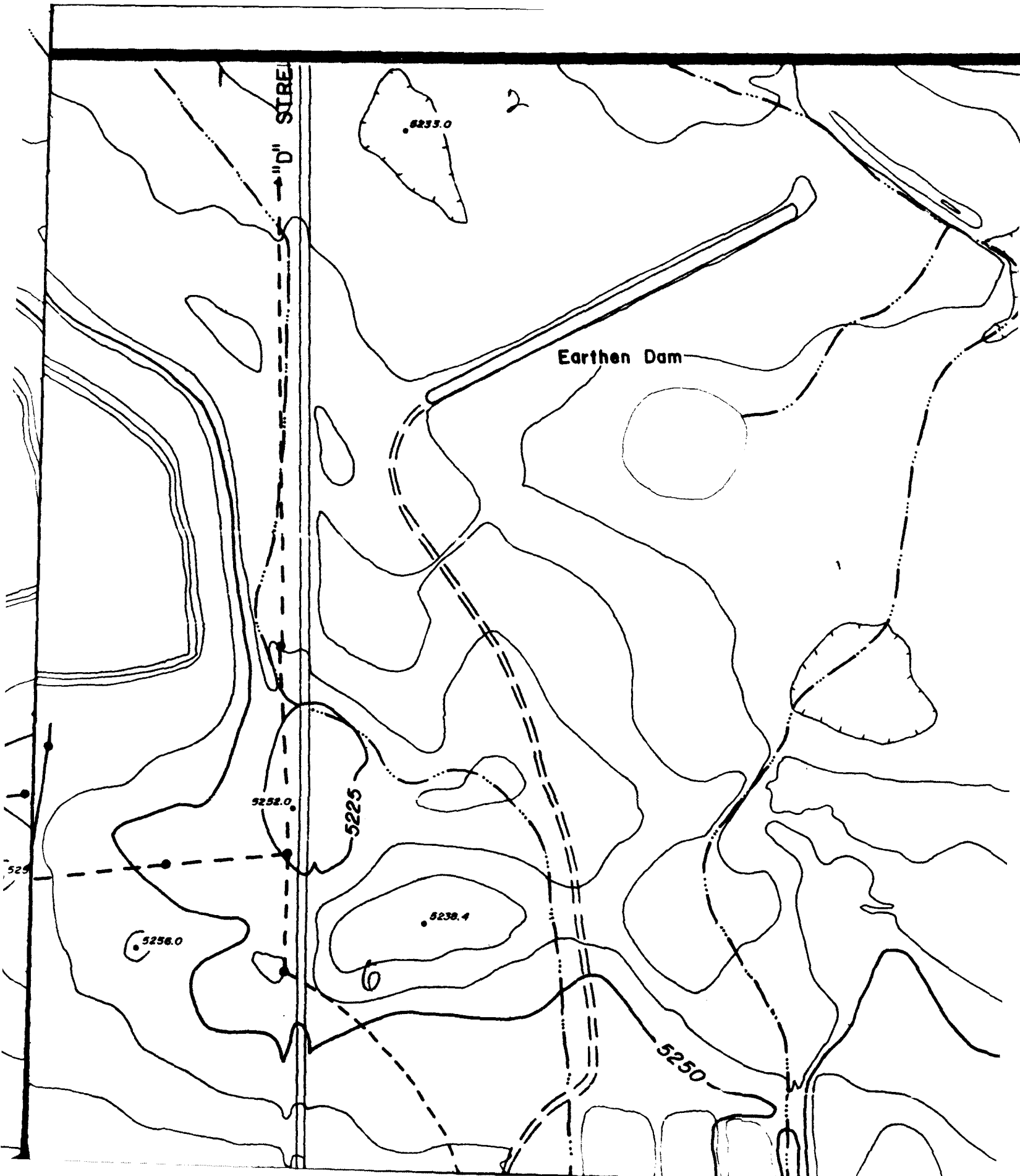
PLATE CS-NP-3

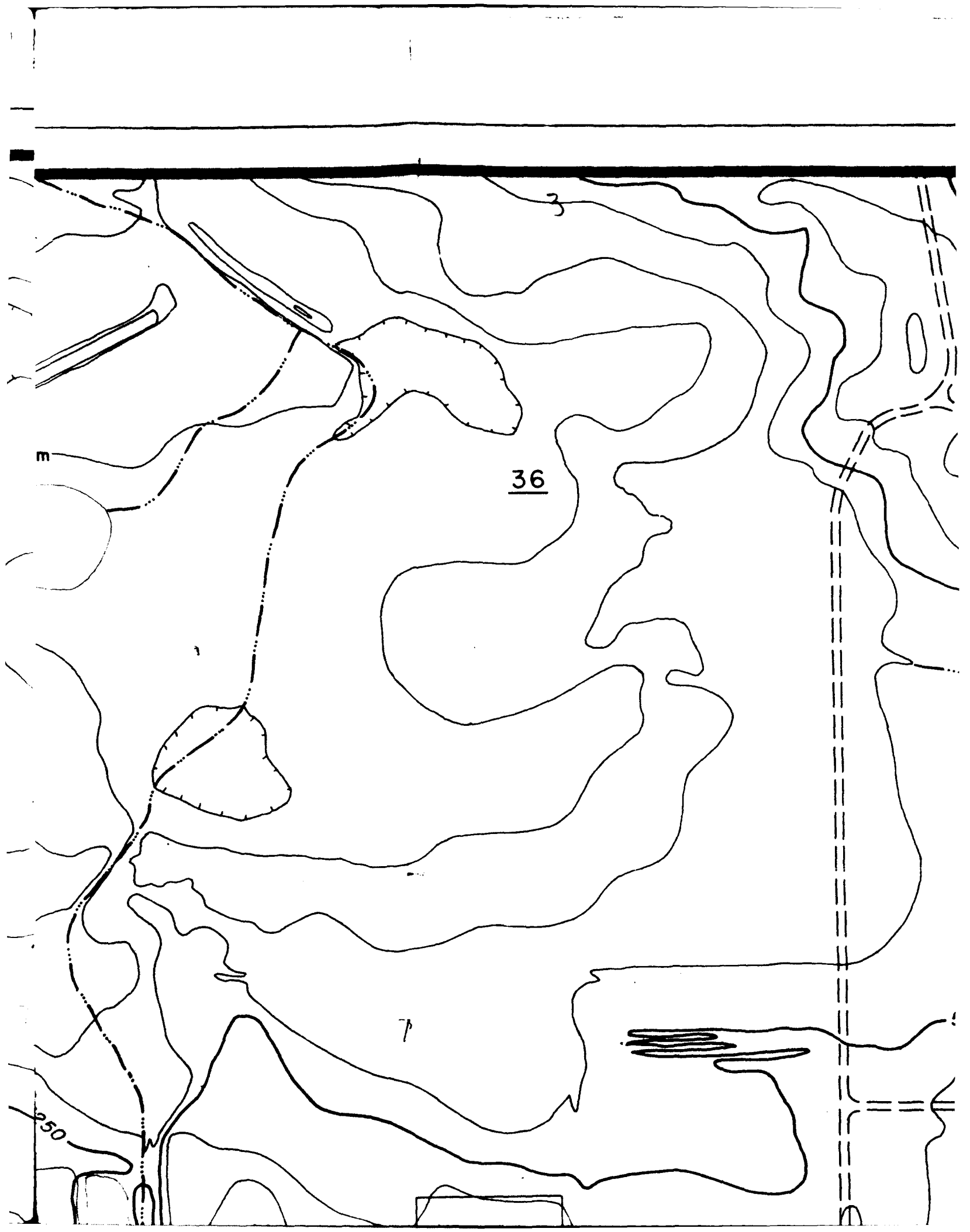
Water Table Elevations and
Generalized Groundwater Flow

Rocky Mountain Arsenal, Task 10

Prepared by : Ebasco Services Incorporated














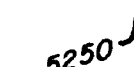






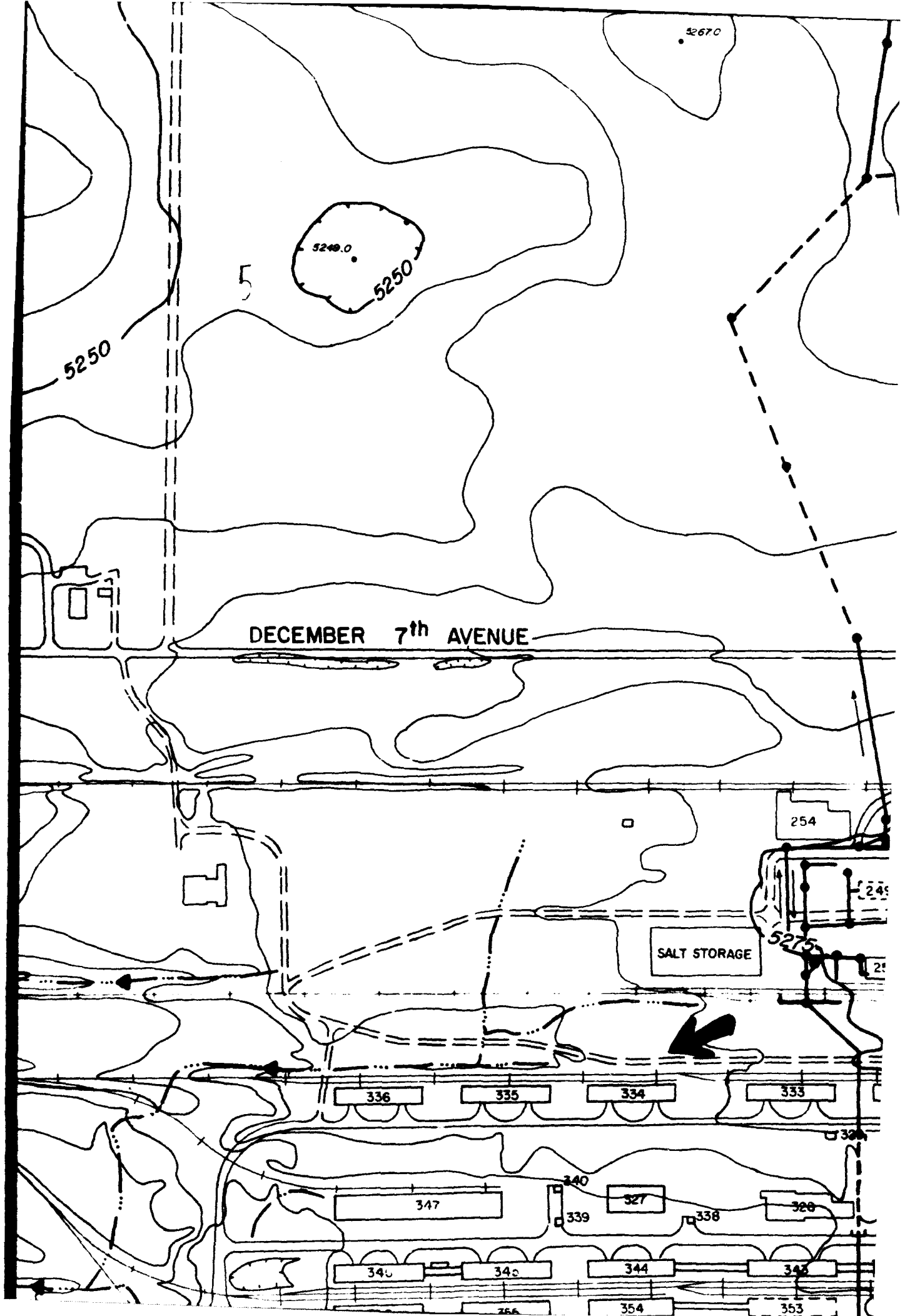


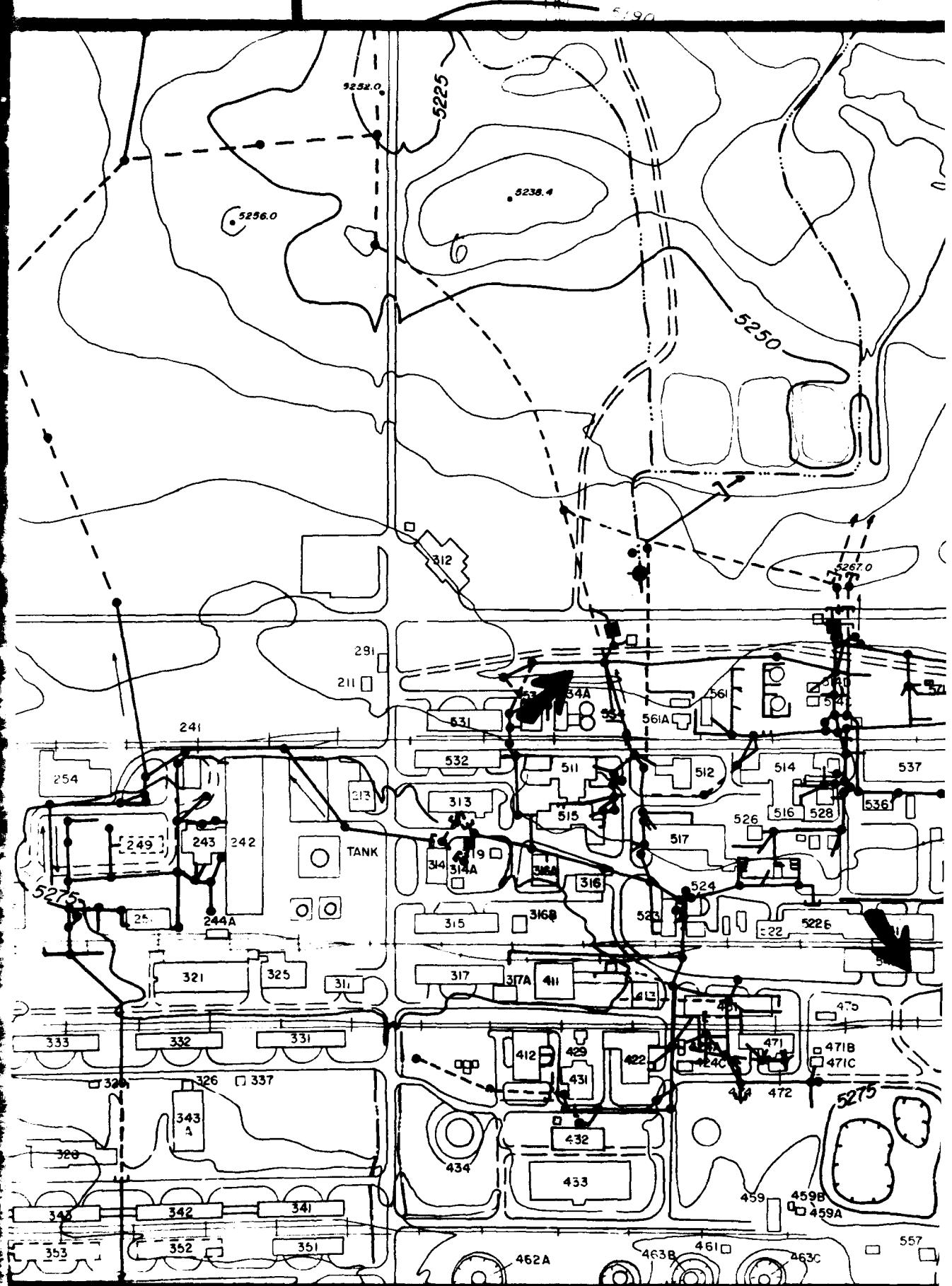


LEGEND

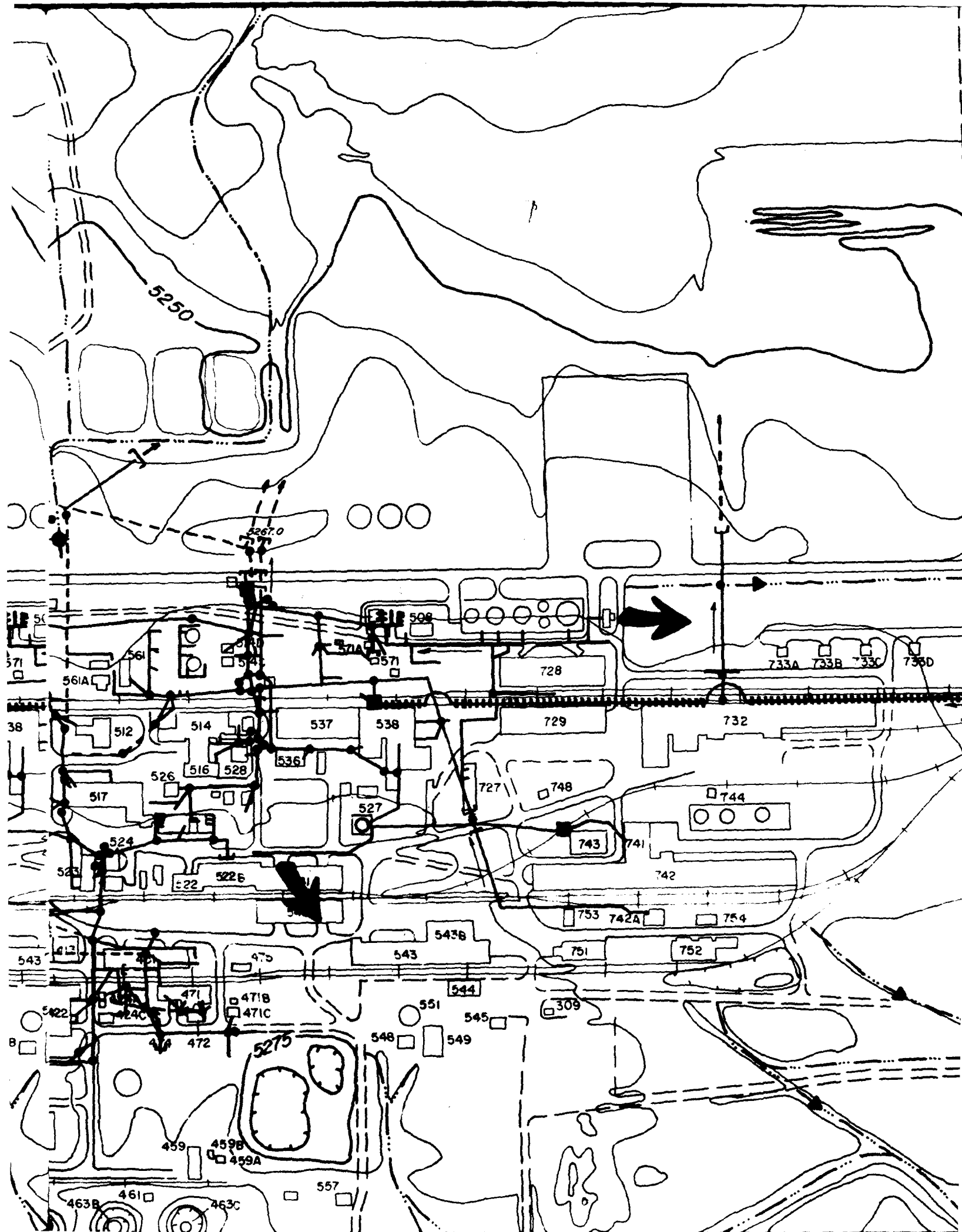
-  Building, Existing
-  Building, Removed
-  Road, Paved
-  Road, Unpaved
- 36 Section Number
-  Railroad
-  Sewer Main
-  Sewer Main, Removed
-  Sewer Main, Overhead
-  Manhole
-  Pumping Station
-  Arrow Indicating Flow Direction
-  Stream or Ditch and Direction of Water Flow
-  Predominant Direction of Surface Water Flow
-  Ground Elevation Above Mean Sea Level
-  ESE Surface Water Sampling Point
-  Spaine & Gregs Surface Water Sampling Point

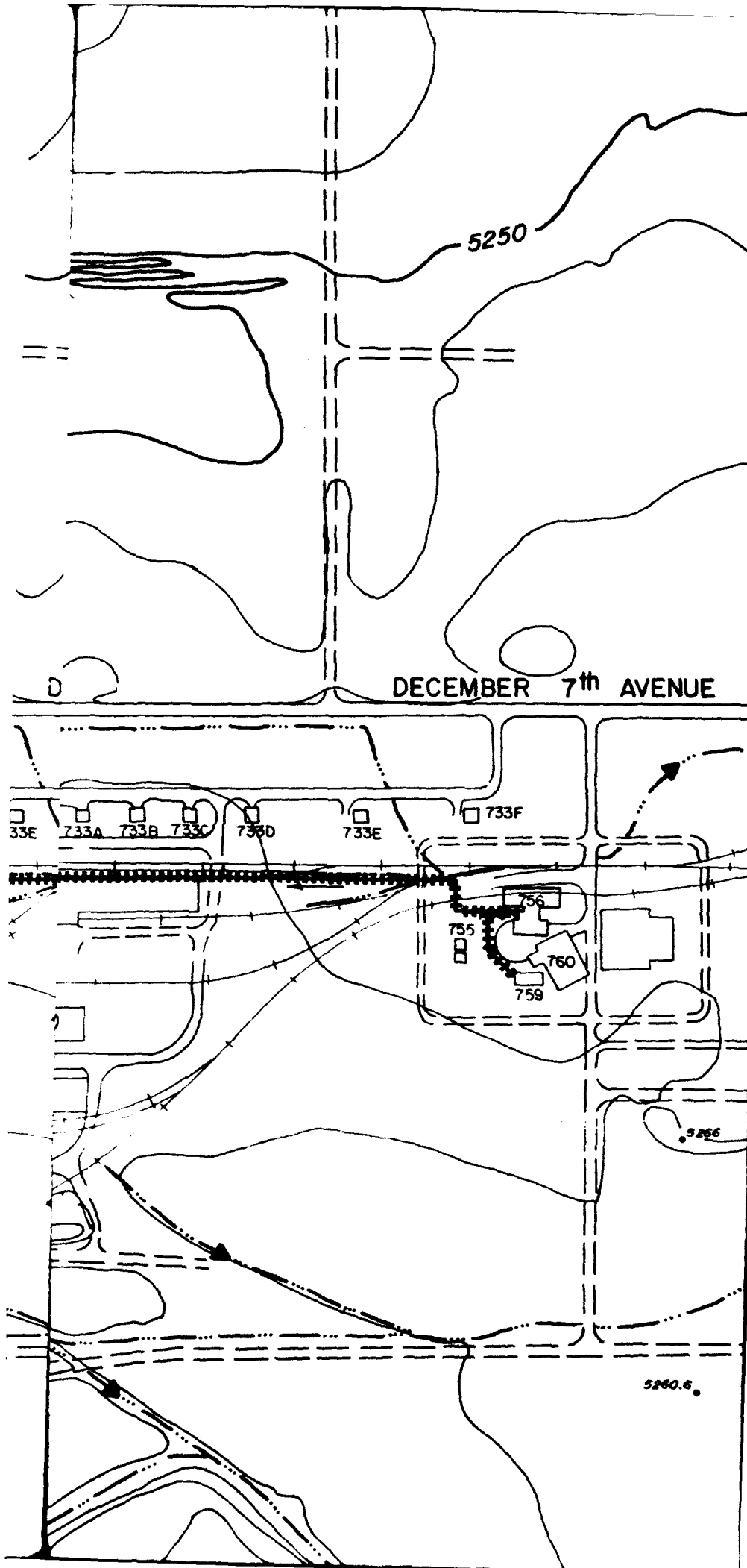
Contour Interval is 5 Feet

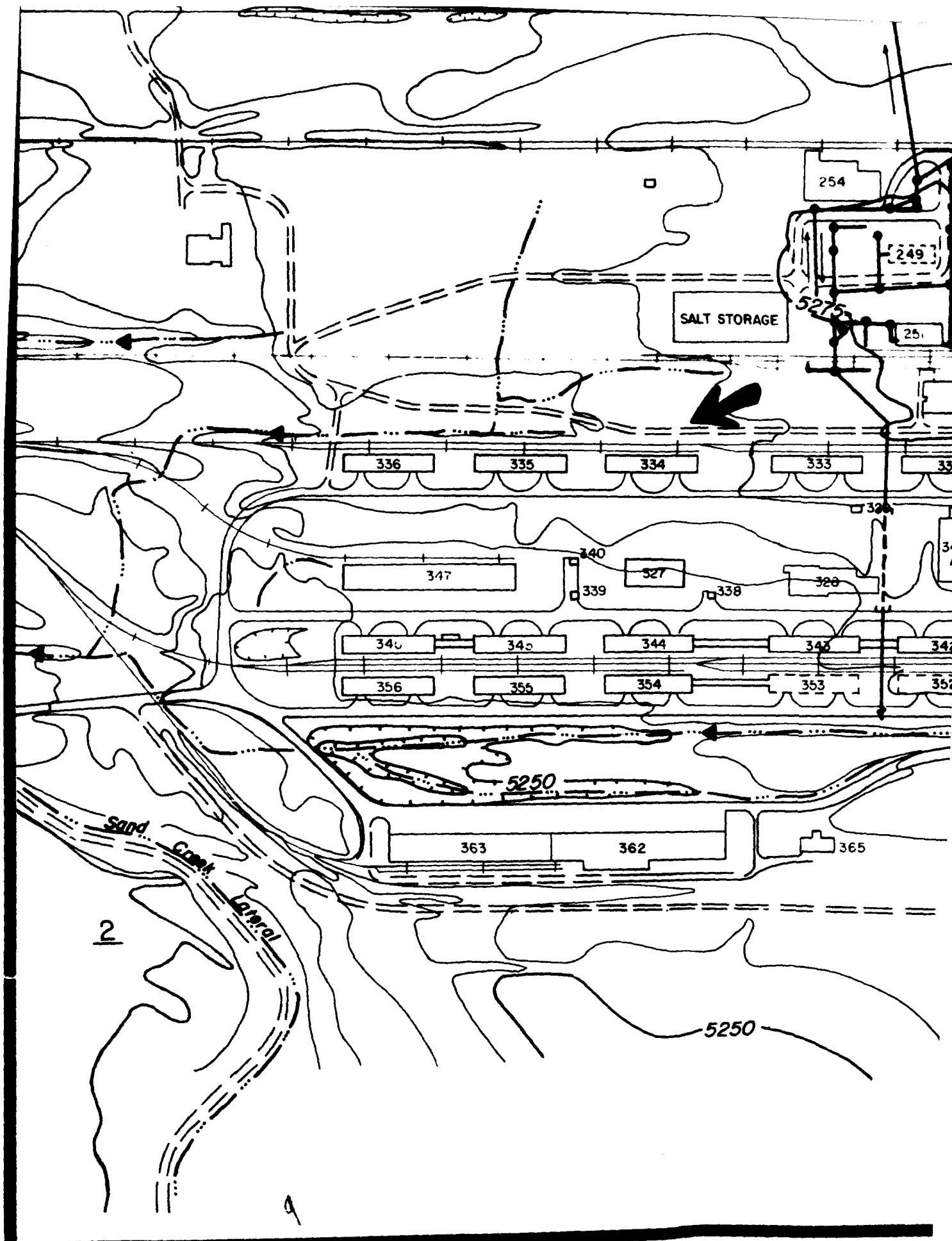


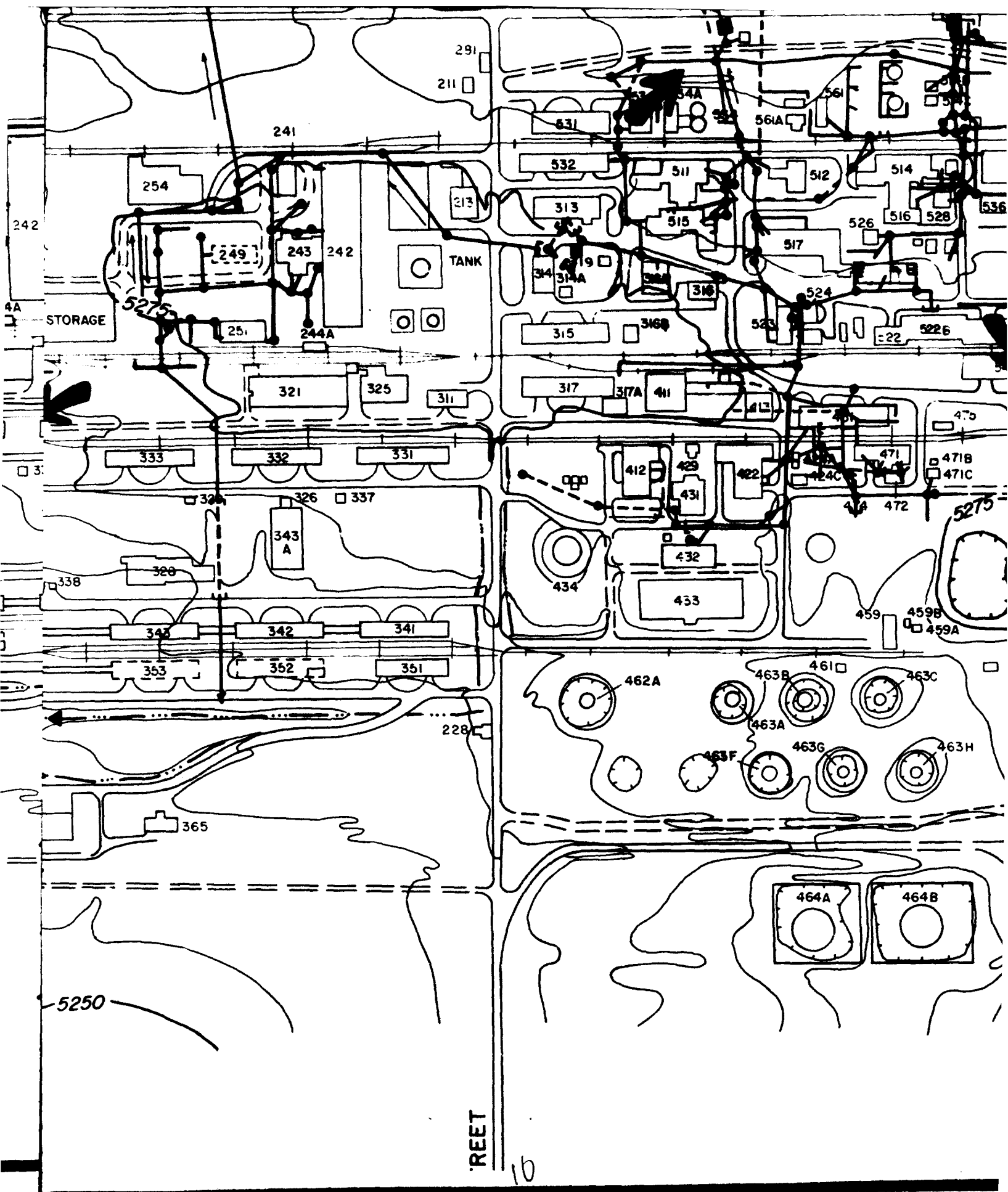


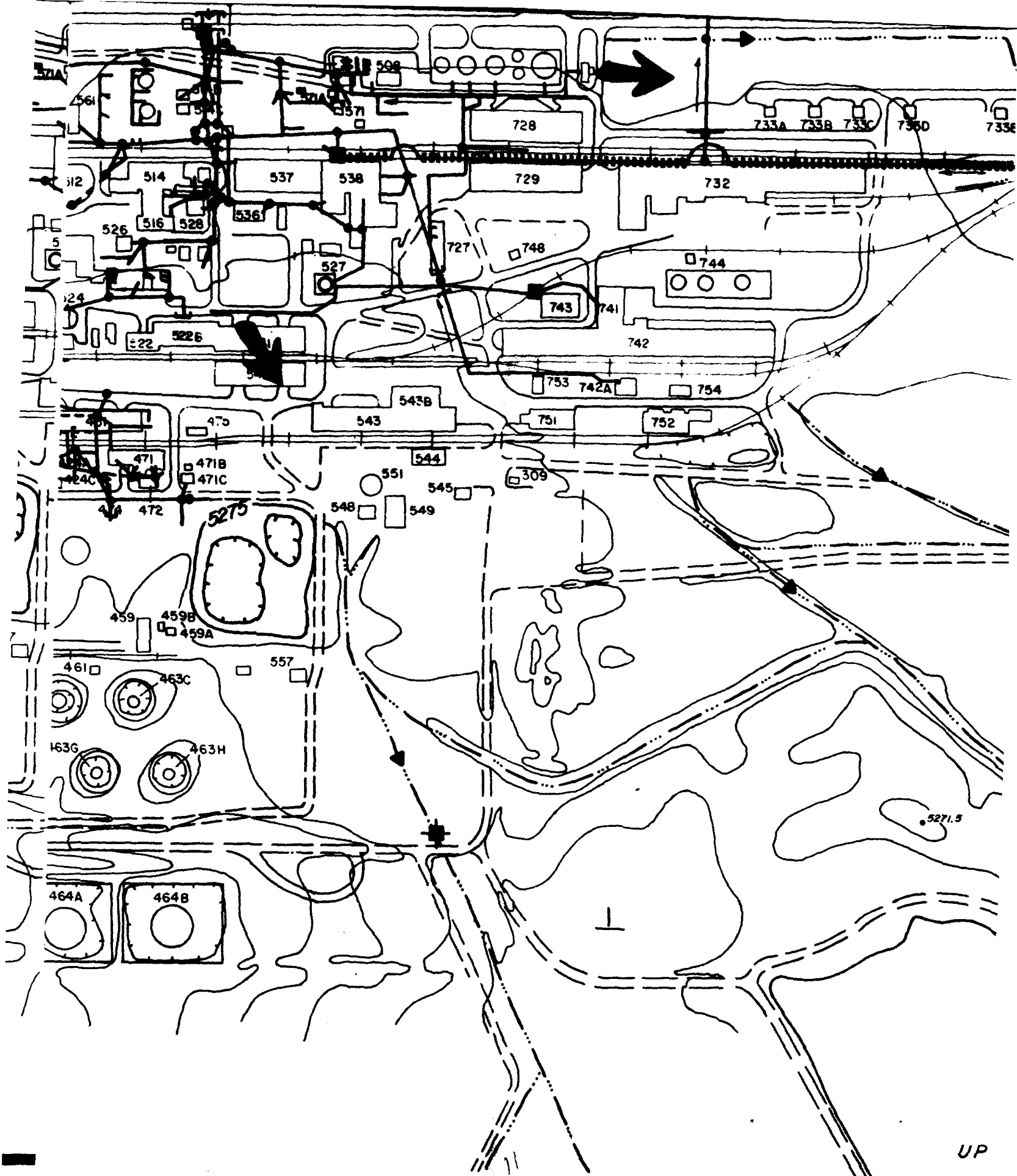
as designated by the
Shell Chemical Company,
with Army numbers given
as appropriate in
parentheses

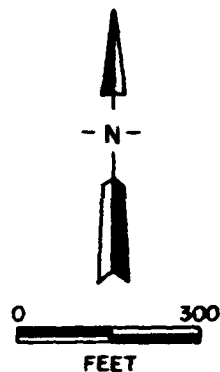
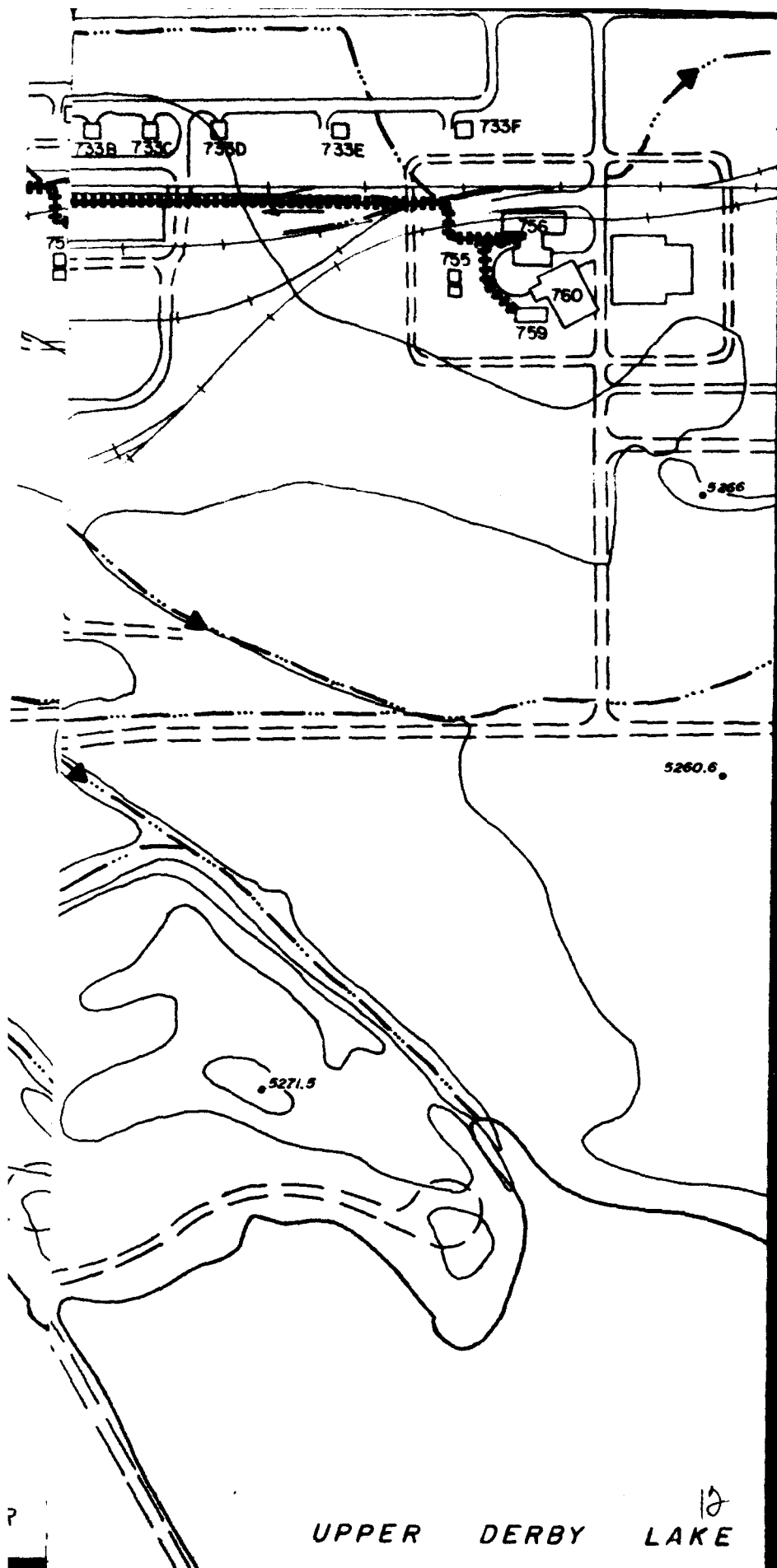












Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

By: Ebasco Services Incorporated

PLATE CS-SP-2

Topography and Surface
Drainage

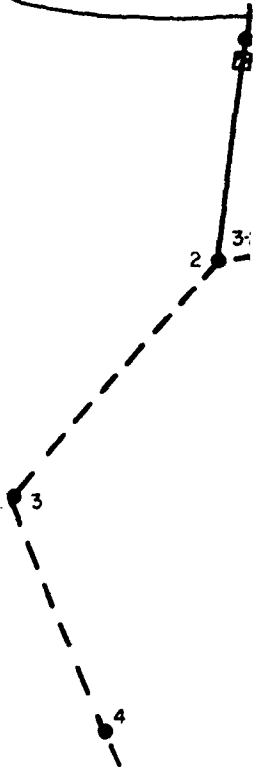
Rocky Mountain Arsenal, Task 10

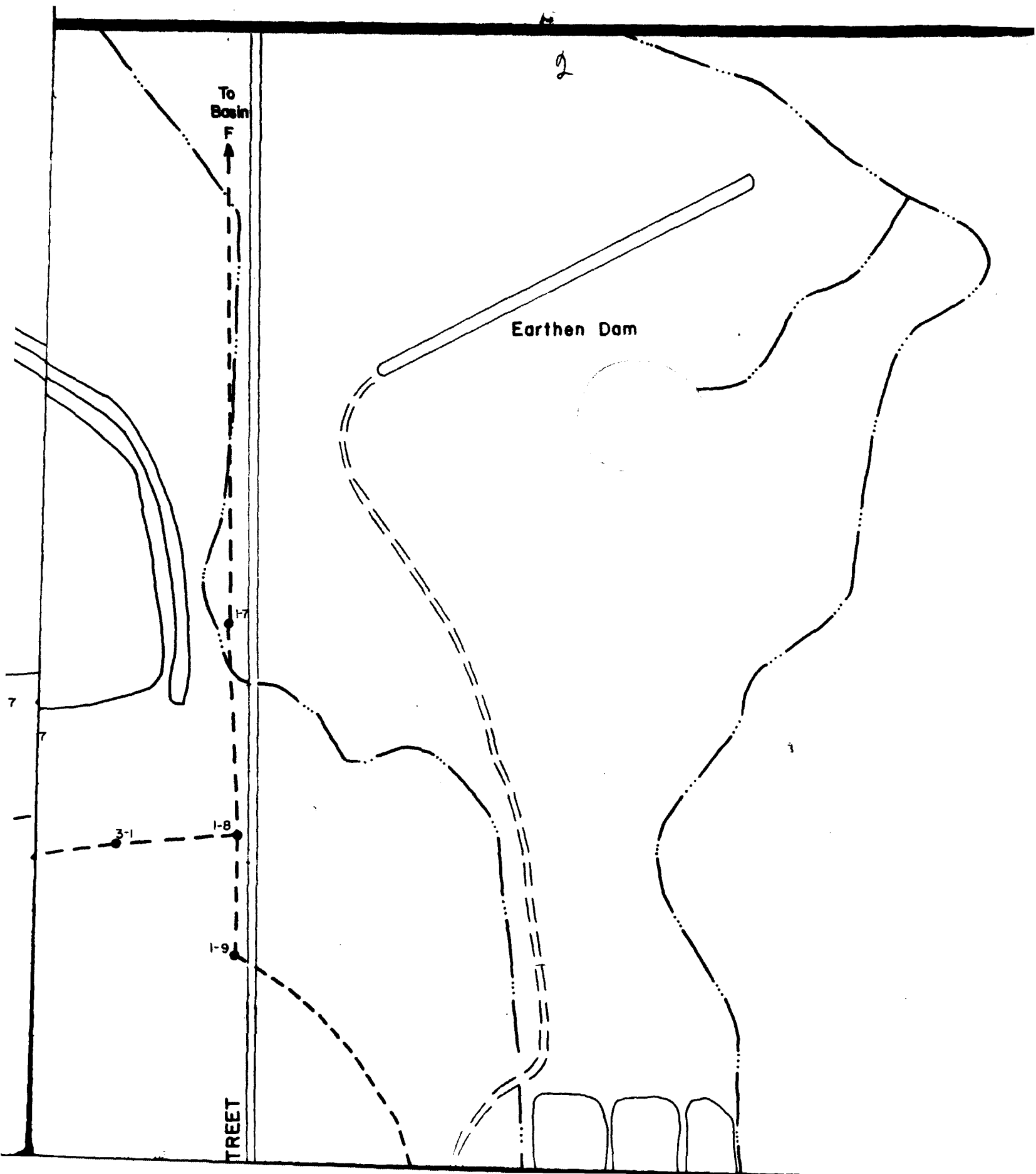
Drafted: 7/8/87

1

35

Dry Reservoir





3

36

7

4

LEGEND



Building, Existing



Building, Removed



Road, Paved



Road, Unpaved

36

Section Number



Railroad



Sewer Main, with Size



Sewer Main, Removed



Sewer Main, Overhead



Manhole, with Number



Pumping Station

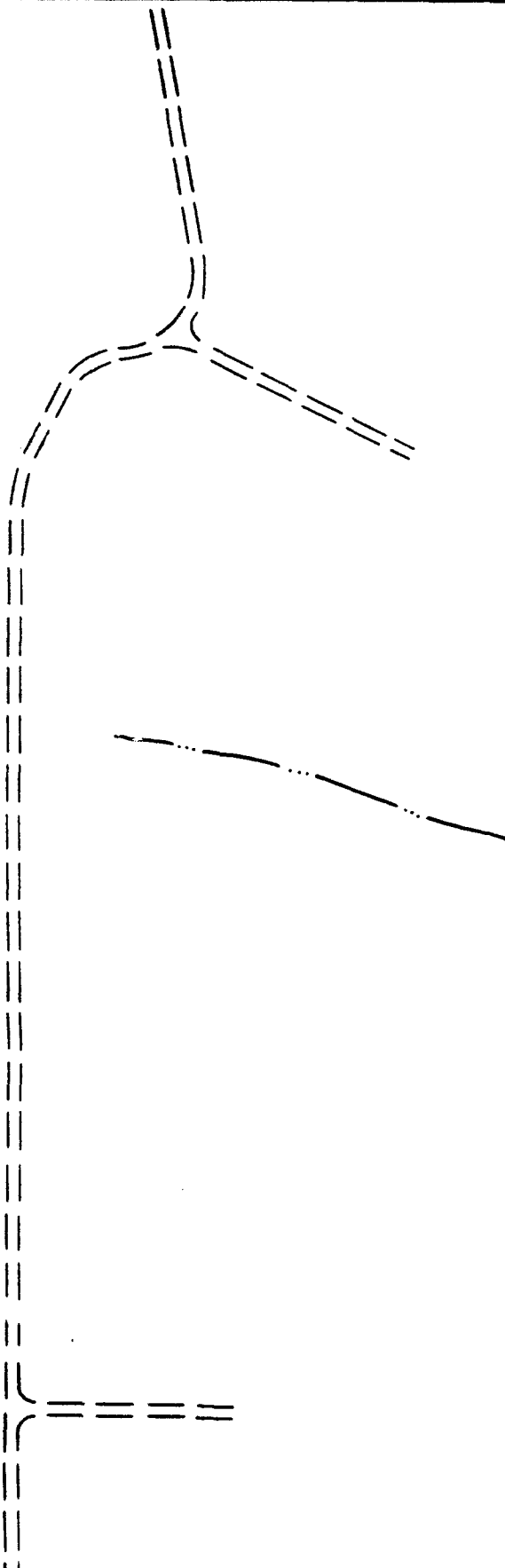


Arrow Indicating Flow Direction



Trench

Note : Manhole numbers appear as designated by the Shell Chemical Company, with Army numbers given as appropriate in parentheses.



5

DECEMBER 7th AVENUE

SALT STORAGE

336

335

334

333

341

327

338

328

341

341

342

343

356

355

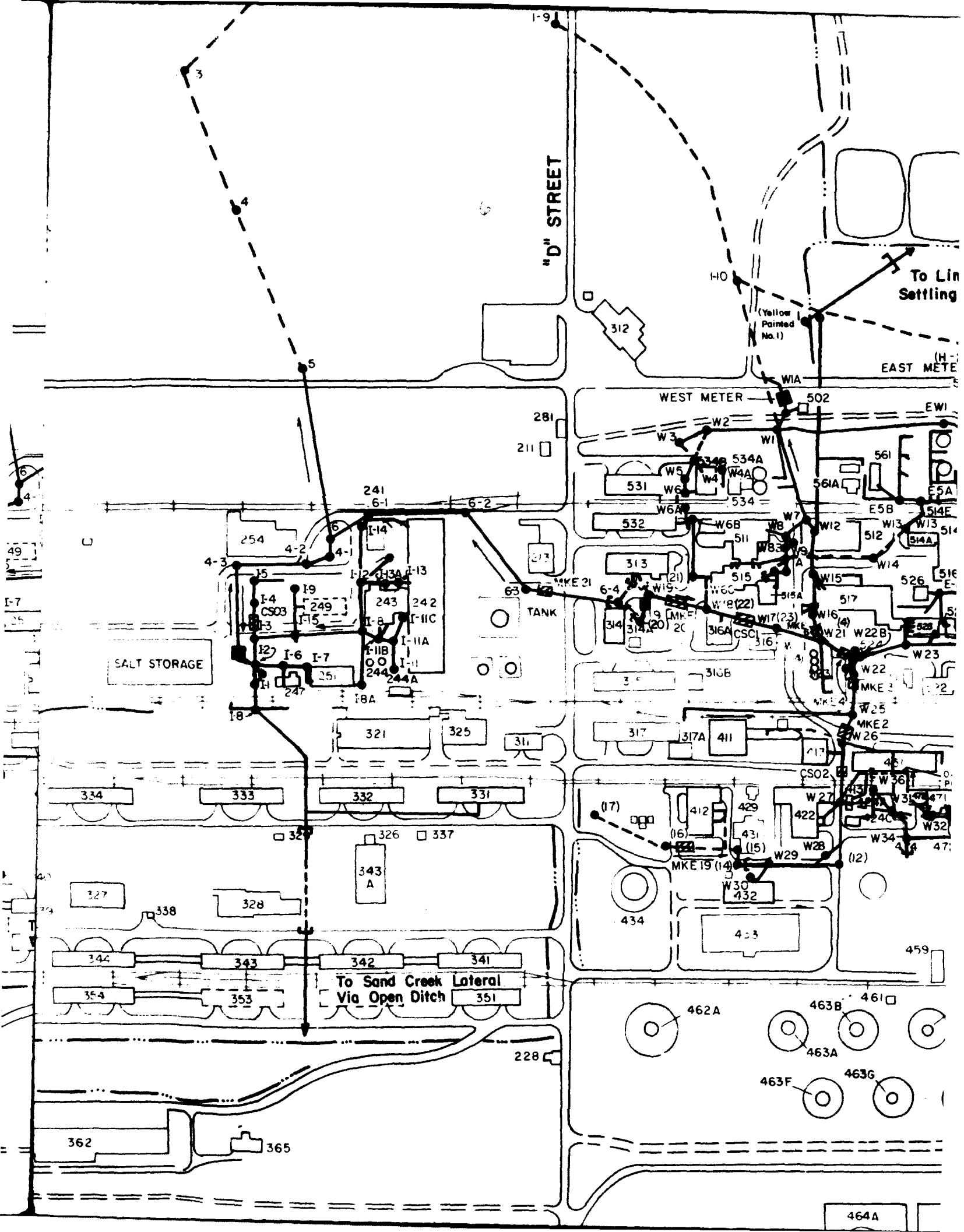
354

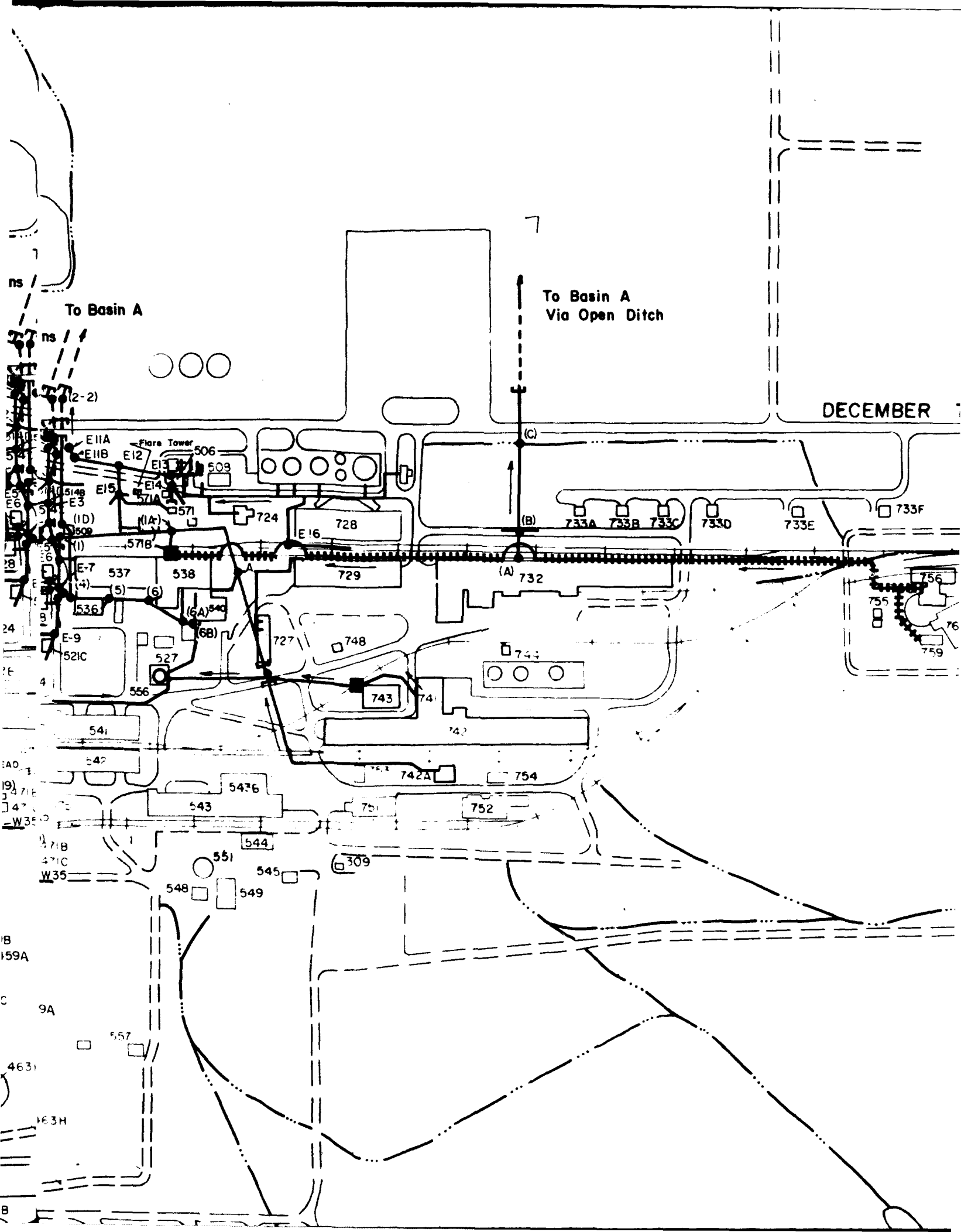
353

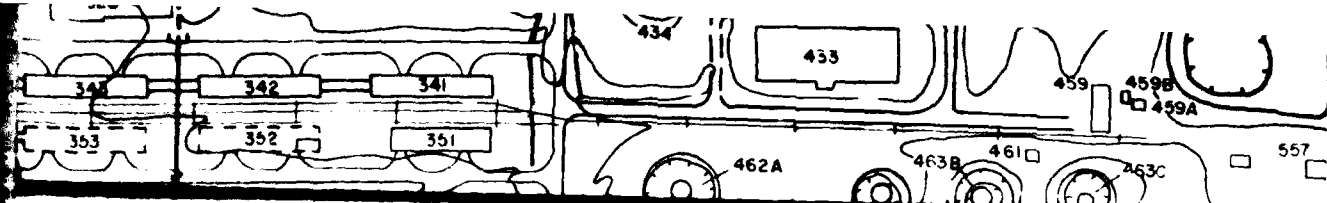
363

362

3



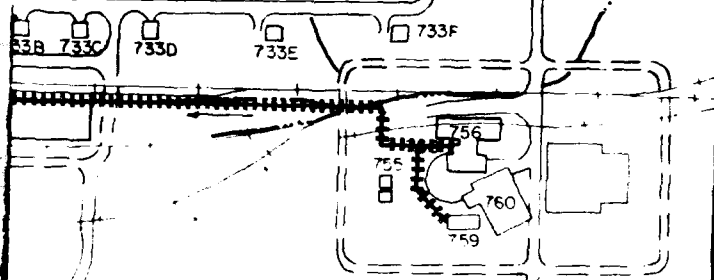




as designated by the
Shell Chemical Company,
with Army numbers given
as appropriate in
parentheses.

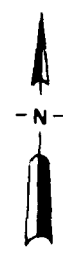
Ditch

DECEMBER 7th AVENUE

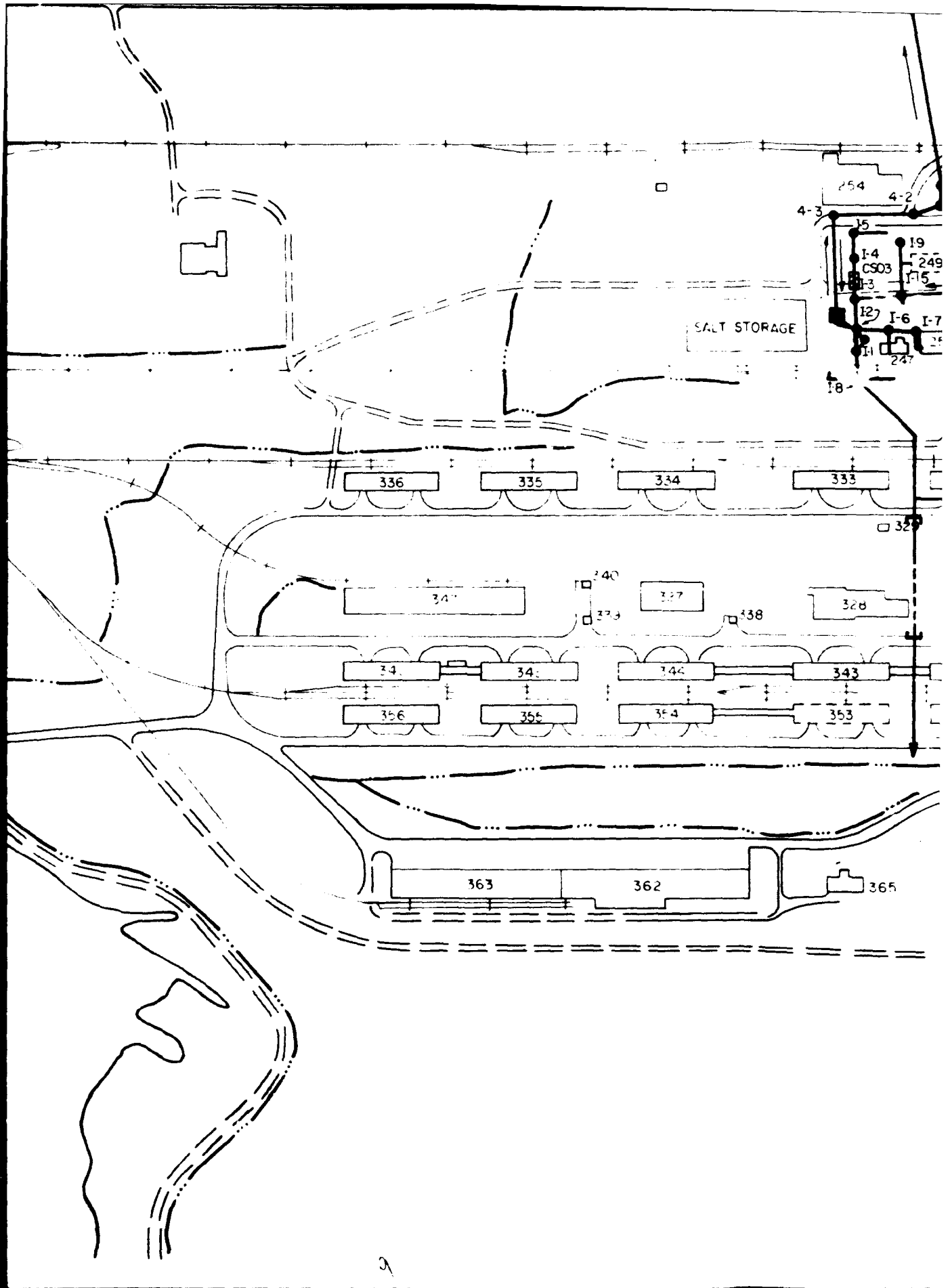


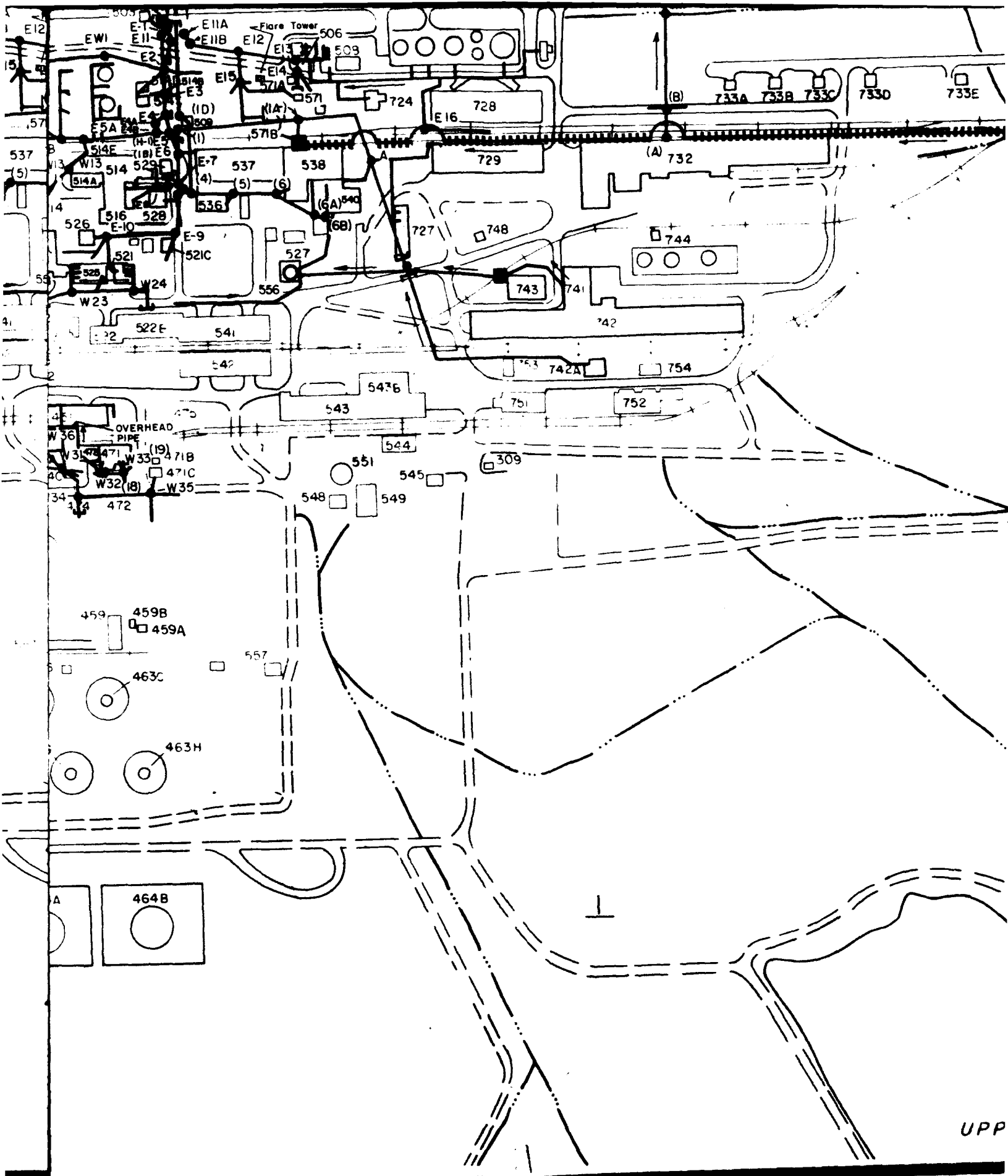
ROCKY MOUNTAIN ARSENAL
LOCATION

		22	23	24	19	20
	27	26	25	30	29	
28	33	34	35	36	31	32
	4	3	2	6	5	
9		11	12	7	8	

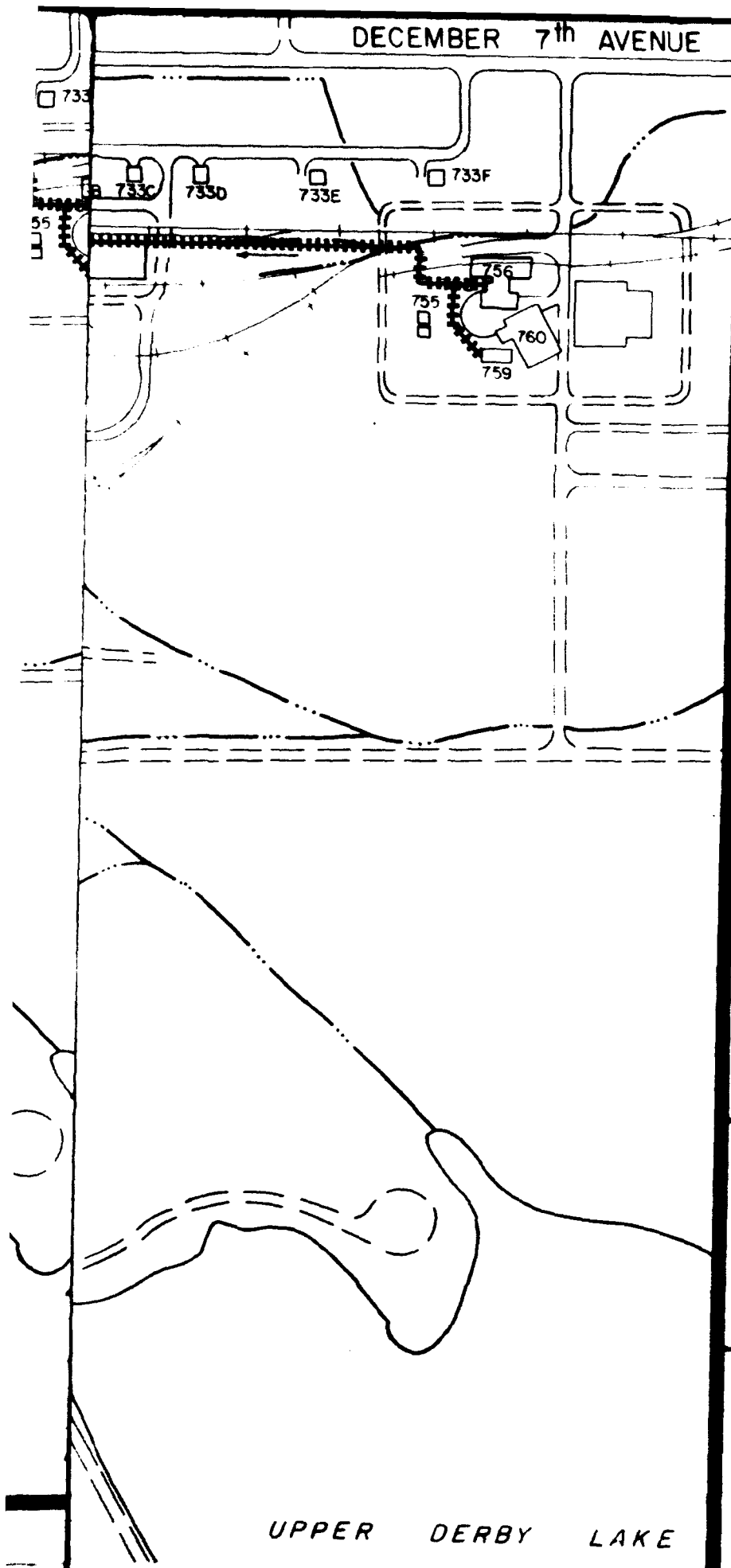


Prepared for:



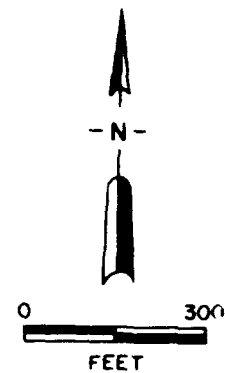


UPP



ROCKY MOUNTAIN ARSENAL
LOCATION

		22	23	24	19	20
	27	26	25	30	29	
33	34	35	36	31	32	
4	3	2	1	6	5	
9		11	12	7	8	



Prepared for:

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

By: Ebasco Services Incorporated

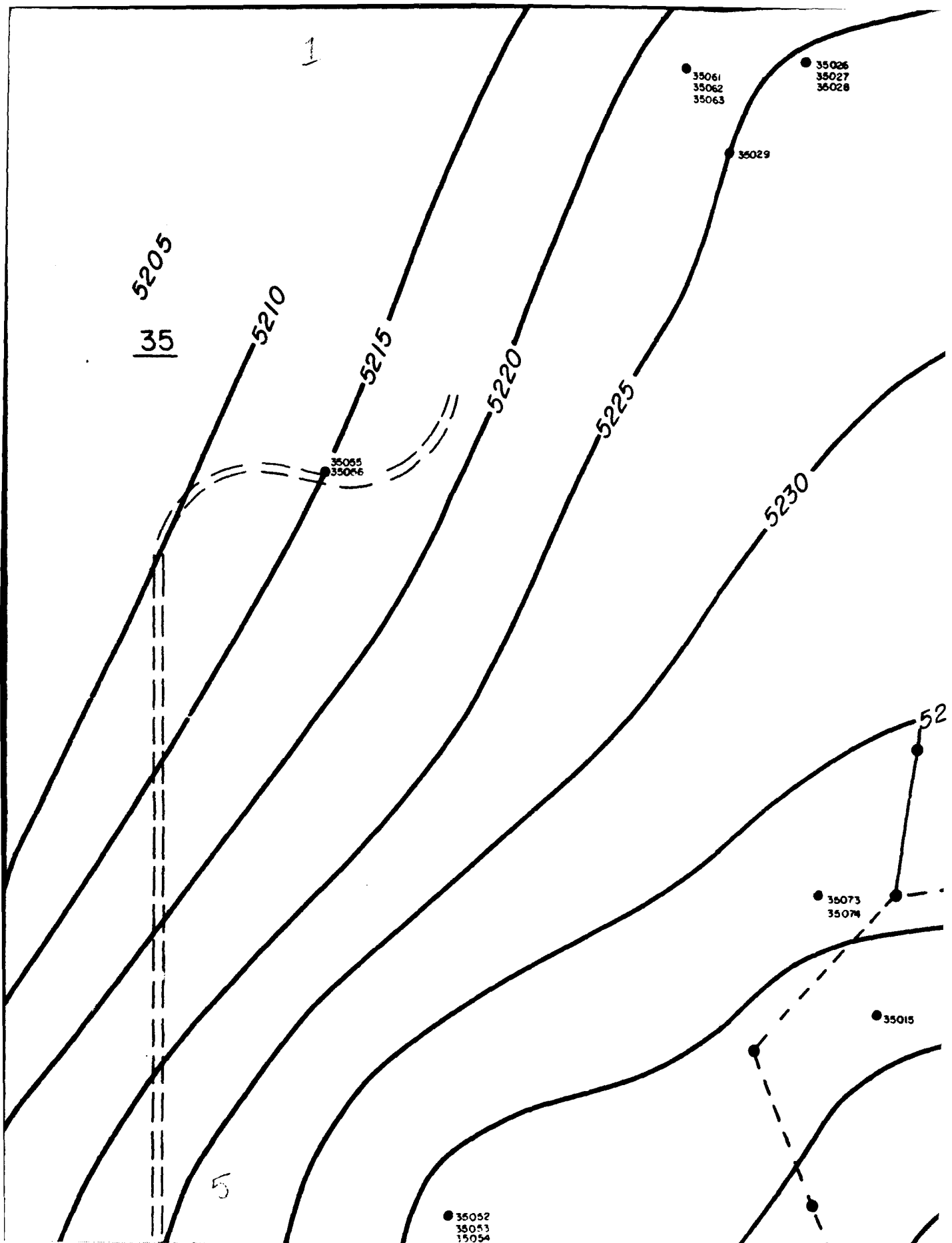
PLATE CS-SP-1

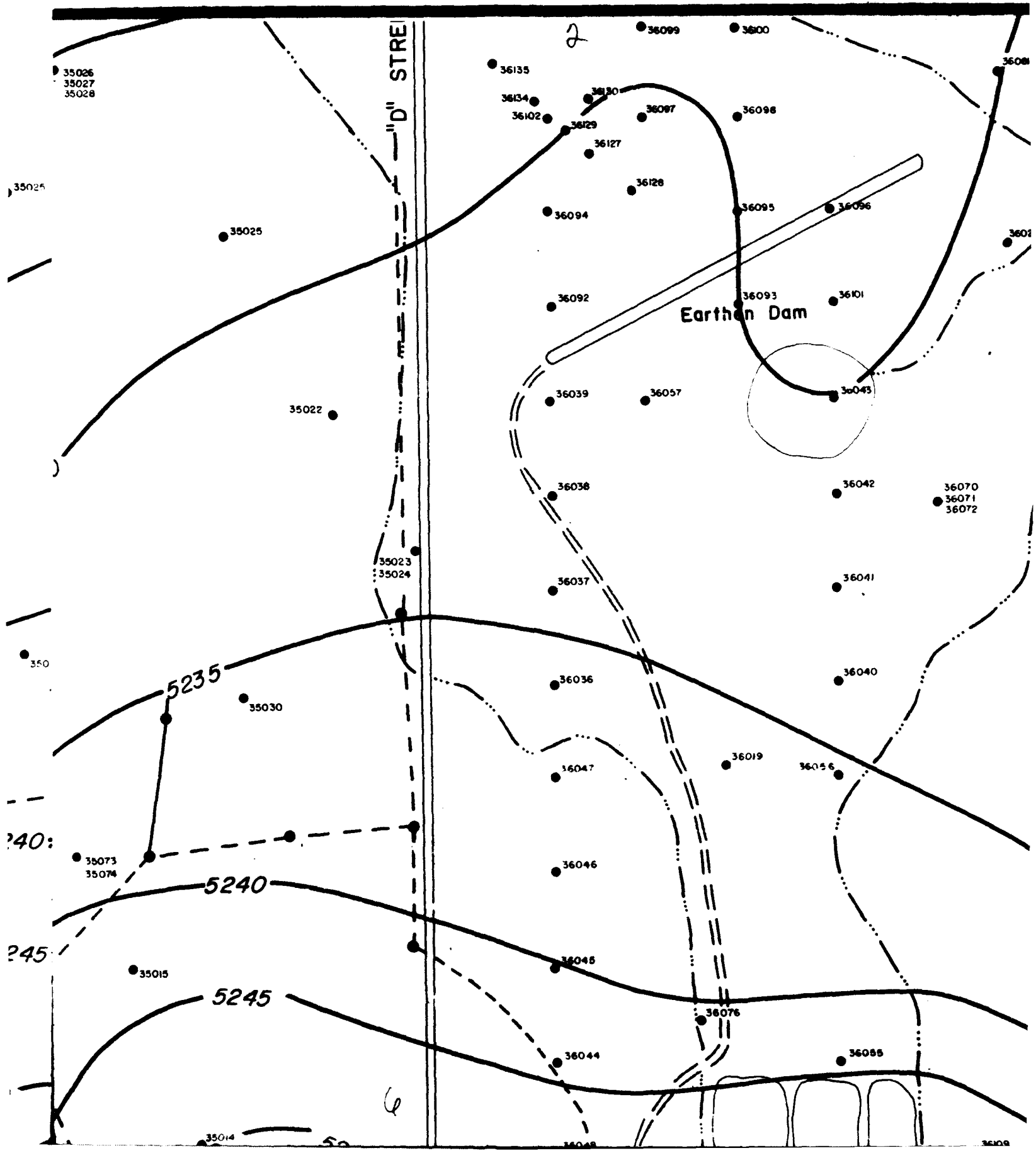
Vicinity Map Showing
Sample Locations

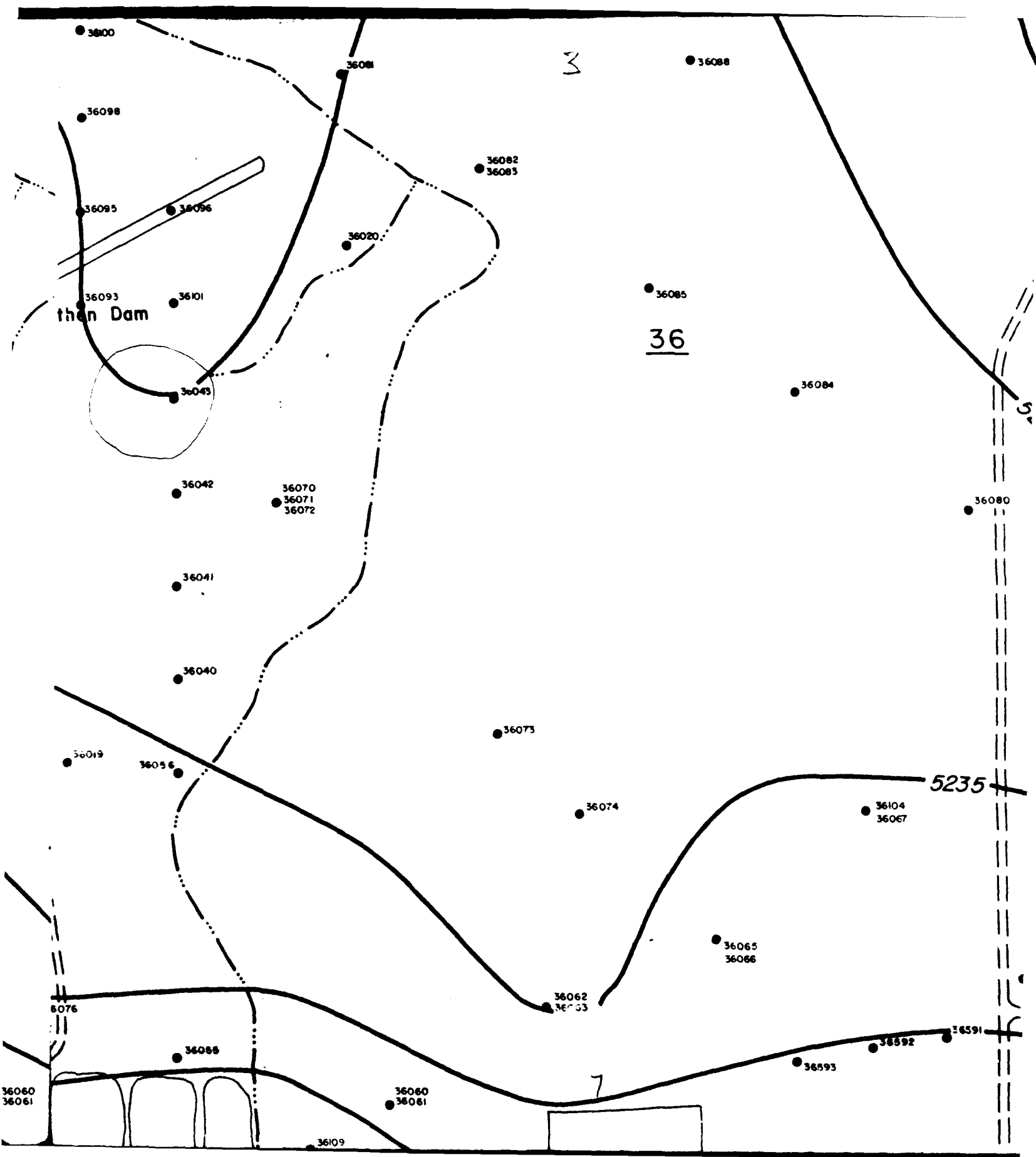
Rocky Mountain Arsenal, Task 10

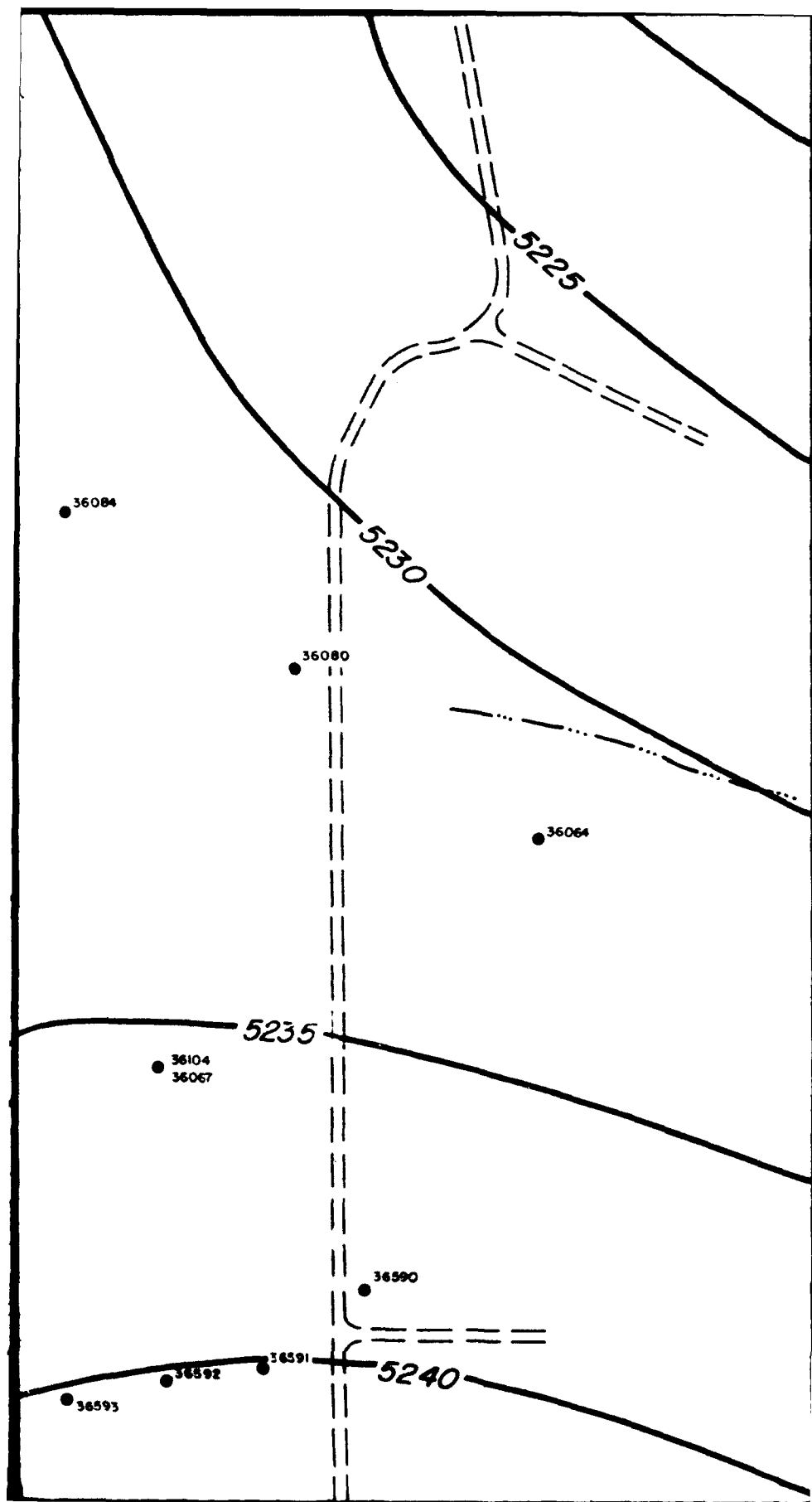
Drafted: 6/25/87

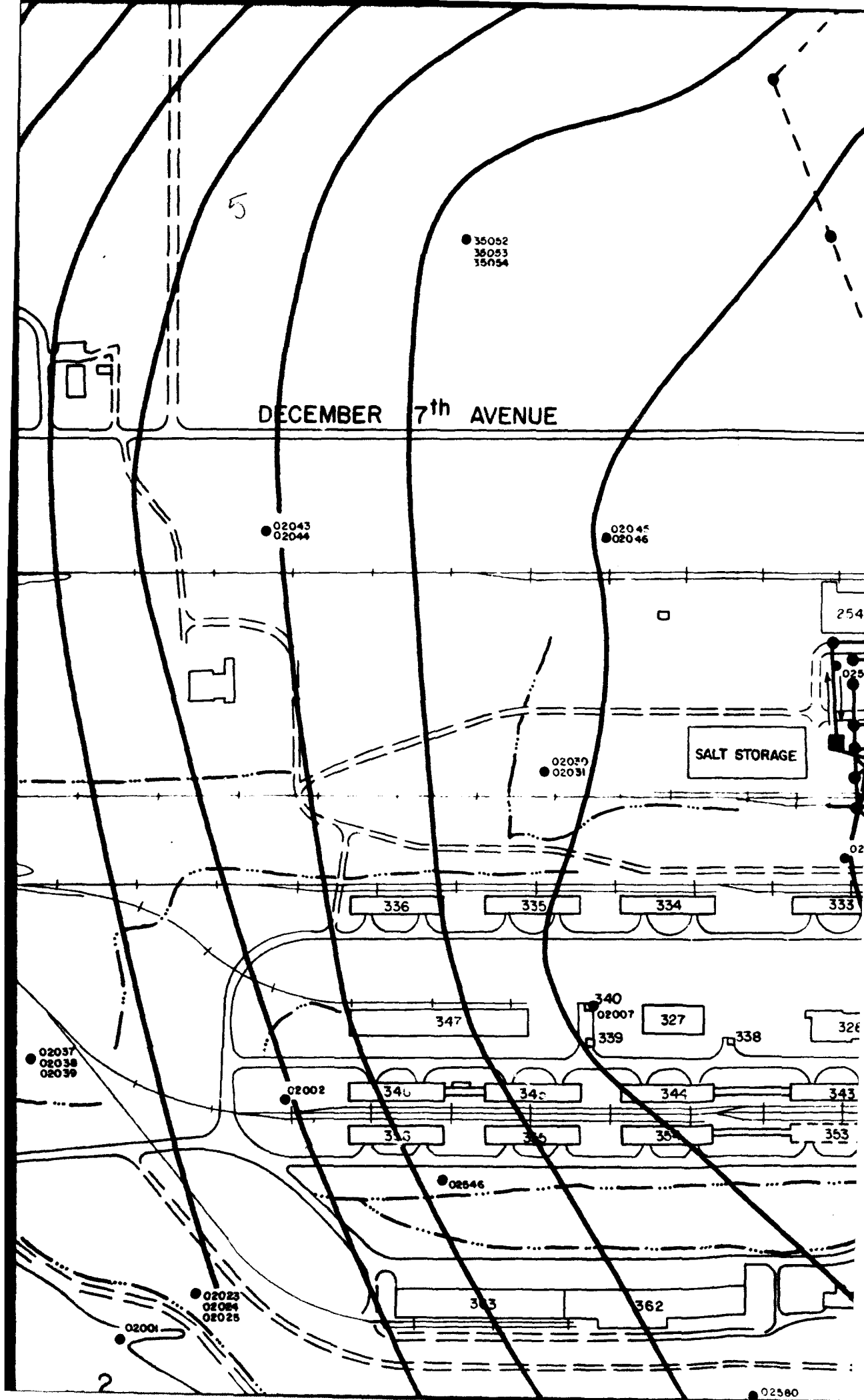
12

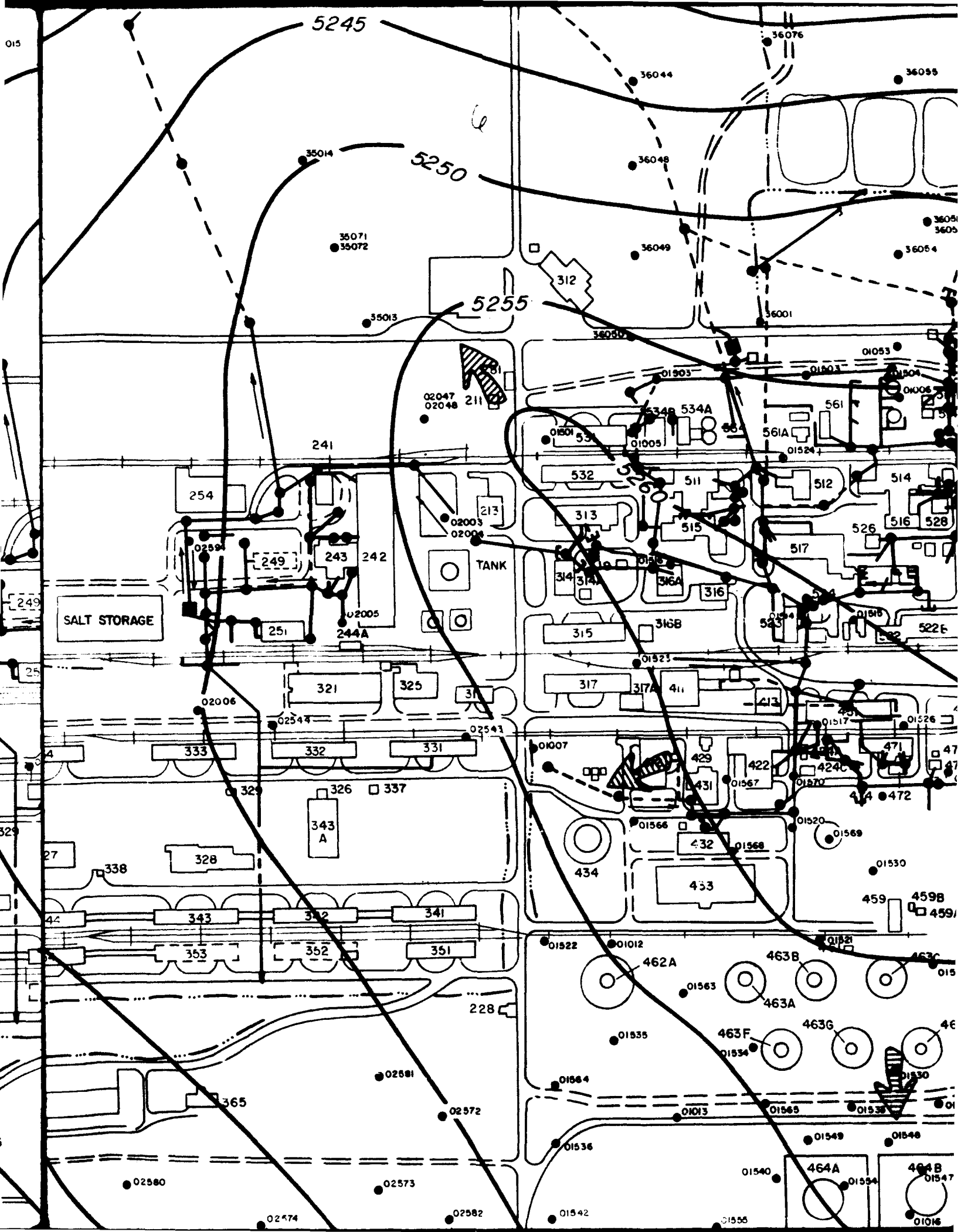


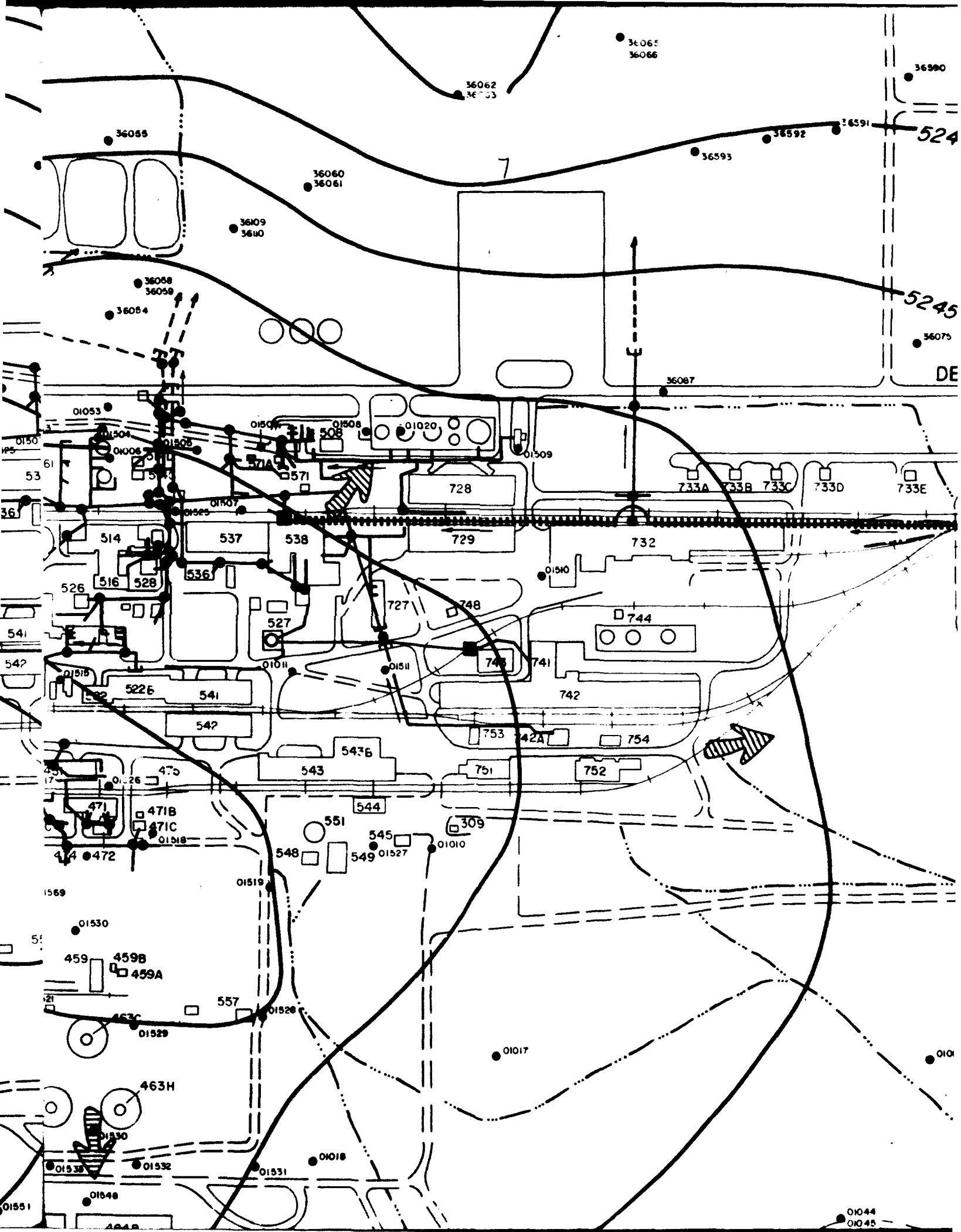


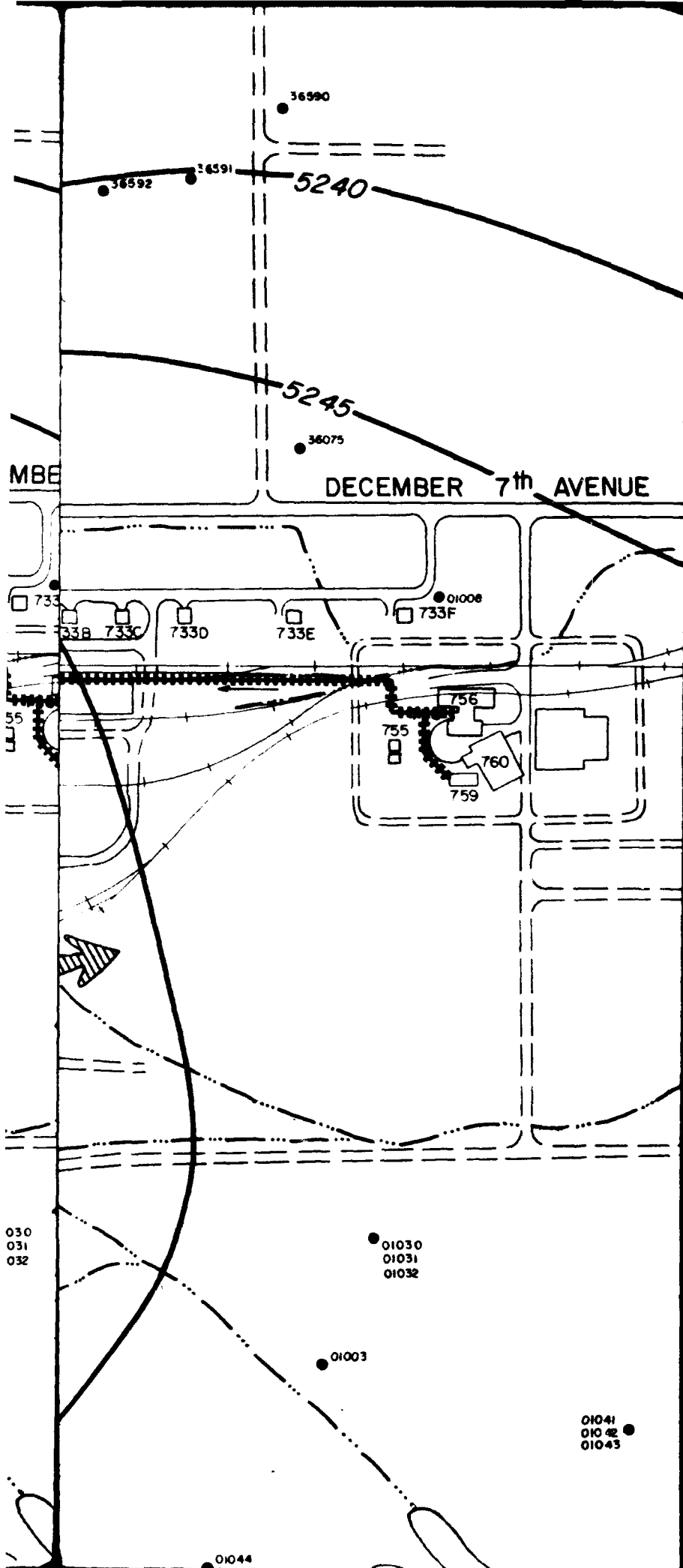






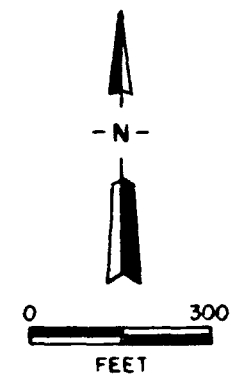




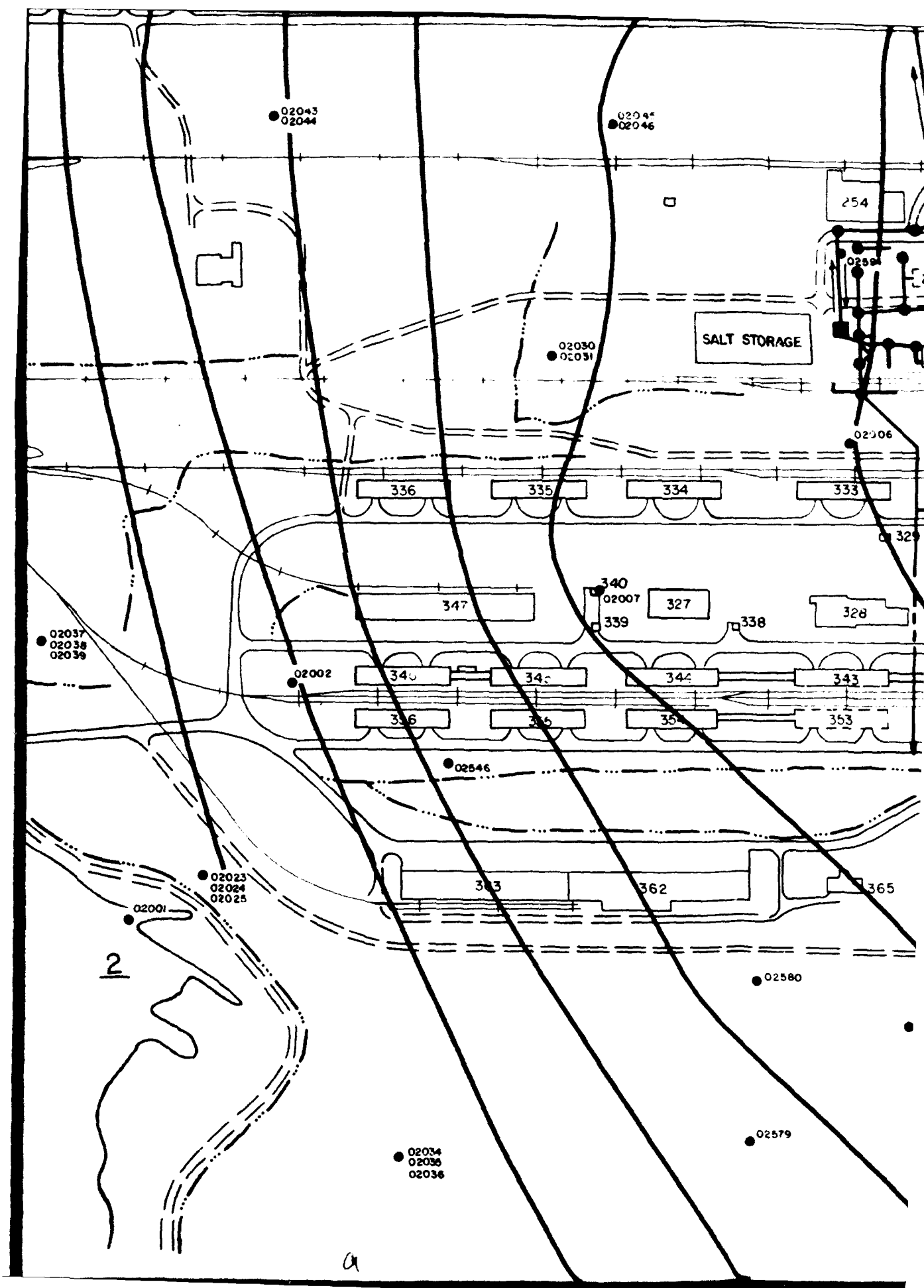


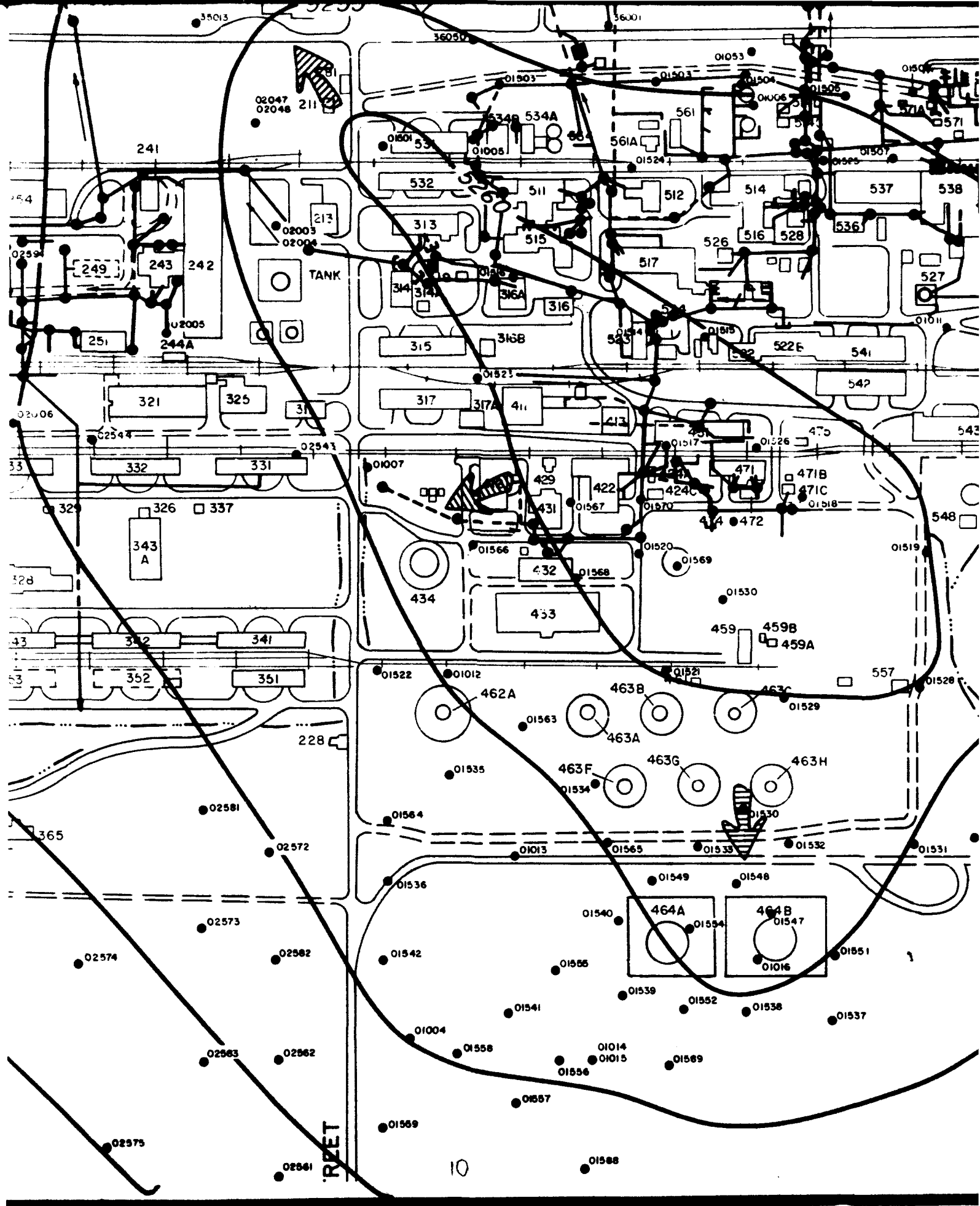
5240 Water Table Elevation

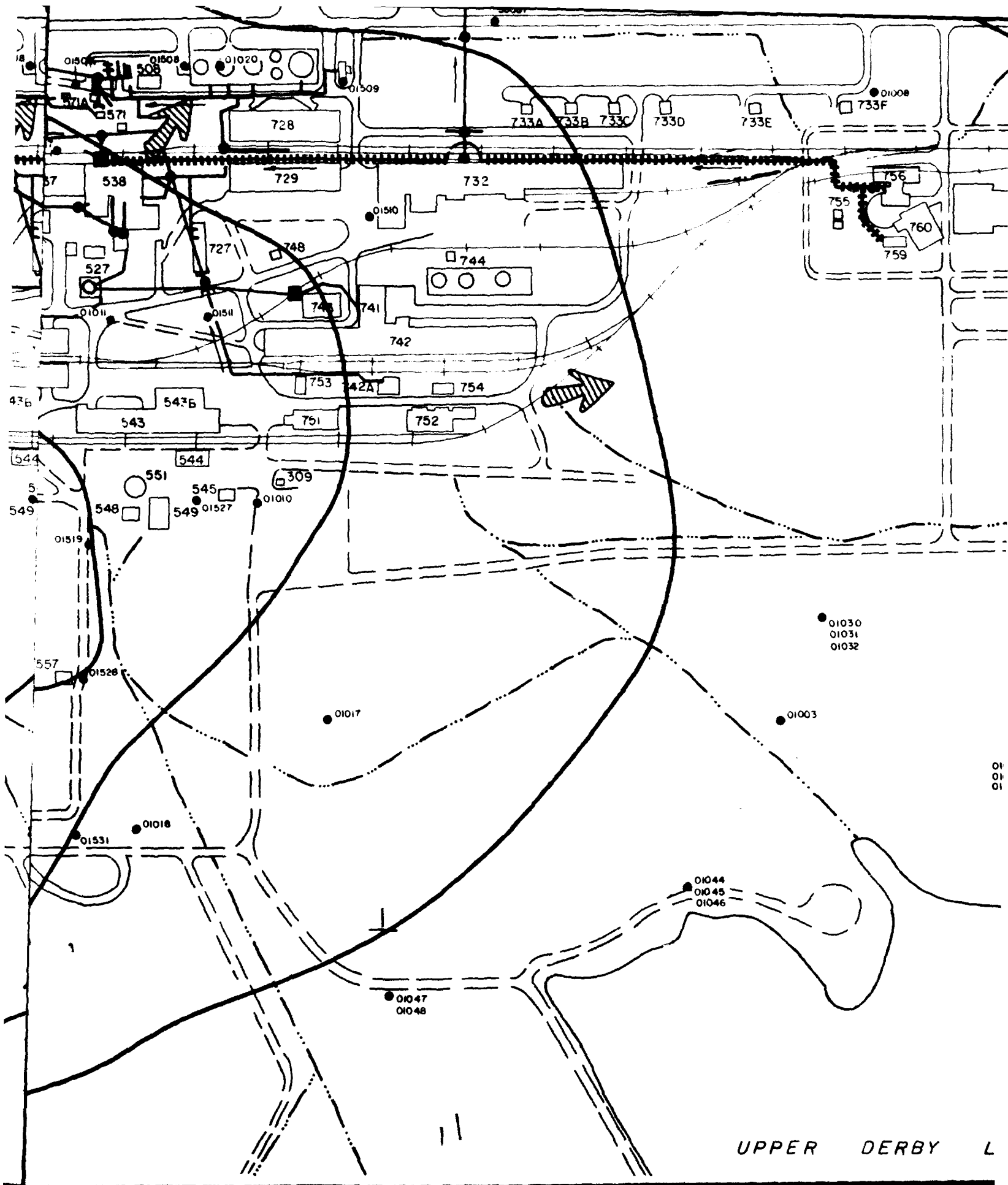
8

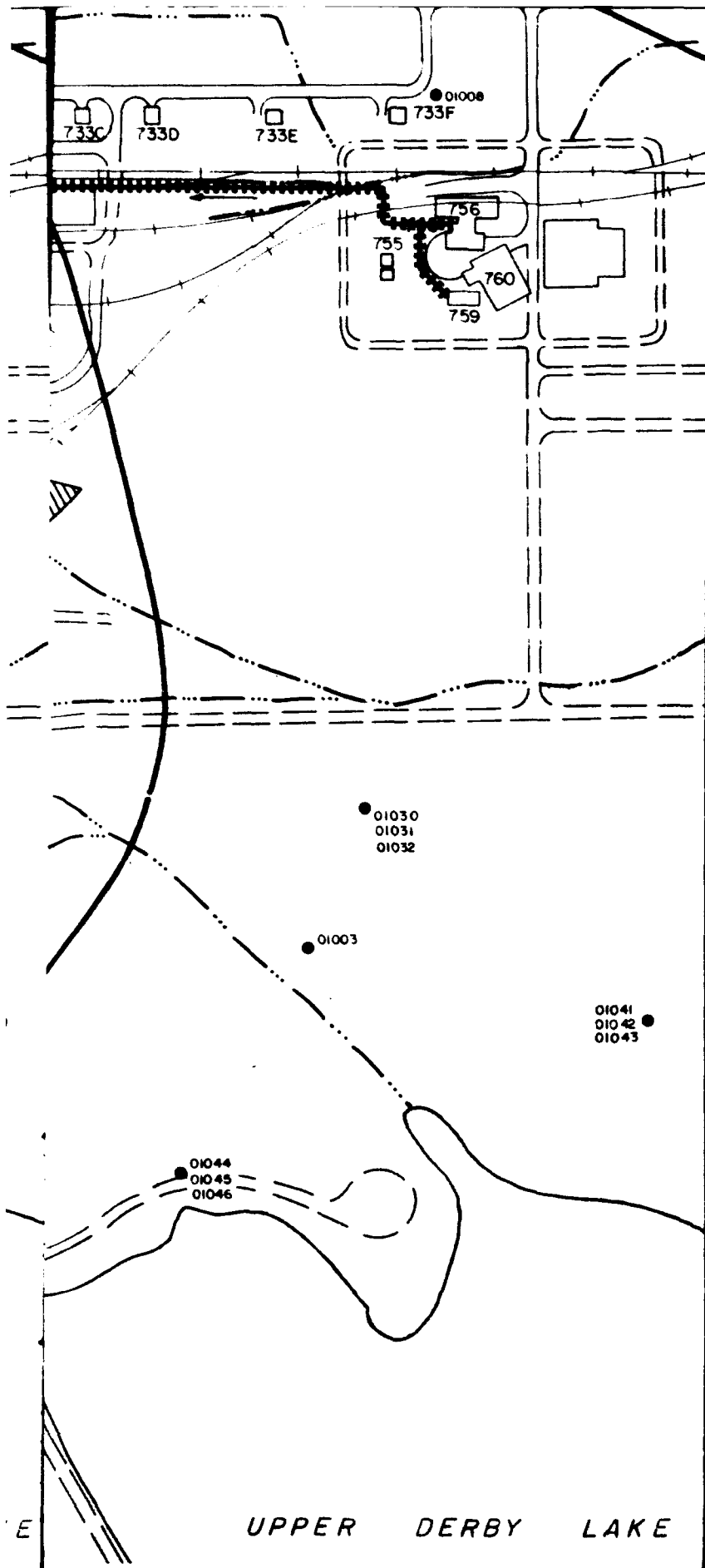


Prepared for :
Program Manager's Office for









Prepared for :

Program Manager's Office for
Rocky Mountain Arsenal Cleanup
Aberdeen Proving Ground, Maryland

By: Ebasco Services Incorporated

PLATE CS - SP - 3

Water Table Elevations and
Generalized Groundwater Flow

Rocky Mountain Arsenal, Task 10

Drafted: 7/7/87

18